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Agriculture.

WINTER CEREALS.

EXPERIMENTS AT ROMA STATE FARM. SEASON 1916.

Before giving the results of the different experiments a brief resumé of the meteorological conditions experienced immediately preceding the sowing and during the growing period of the crops will be given.

At the time of sowing (May) the prospects were very little, if any, brighter than at the same time in 1915, there being practically a complete absence of moisture in the soil and subsoil. The reason why this was so can be readily understood when it is learned that the rainfall for the twelve months ended 31st May was 863 points, representing forty-seven falls, of which quantity only 567 points fell after the removal of the previous crop. Had the latter amount been experienced in one or two falls it would have been of some value, but it represents the total of thirty-seven, the heaviest of which yielded 49 points, so very little benefit accrued therefrom, more especially as it was recorded during a period when the evaporation was at its greatest pitch. With the advent of June, relief came, as a welcome change took place during the first week, 65 points of rain being recorded, which in itself was sufficient to promote the germination of all the grain sown. The weather continued showery, and by the end of the month the total precipitation reached 307. July saw a continuance of the congenial conditions, 275 points being registered. August also may be considered favourable, 1½ in. of rain falling. Such conditions resulted in exceptionally heavy growth being made. September saw a curtailment in the precipitation, with the result that the heavy

call on the moisture contents of the soil, made by the exceptionally heavy growth, had such an effect as to reduce it so that it was insufficient to meet the full requirements of the crops, which resulted in a reduction of the ultimate yield by a pinching of the grain. Possibly the injury occasioned by the reduction in the moisture supply was much less than the benefit it conferred in checking the visitation of rust, which first made its appearance about the middle of August, and which gave every indication of being very virulent. The cold snap experienced in the latter part of that month was also very serviceable in checking its career, although it resulted in the frosting of wheat in some localities. The middle of October, when most of the early varieties were beyond benefiting from rain, showery weather set in, continuing throughout the balance of that month and the next, with the result that harvesting operations were delayed, quality of grain depreciated, and a goodly portion of the crops rendered worthless.

The following is a tabulated list of the rainfall for the thirteen months ended November, 1916:—

Month.	Wet Days.	Points.
November (1915)	4	55
December (1915)	6	91
January (1916)	6	55
February „	6	140
March „	3	161
April „	7	65
May „	0	0
June „	9	307
July „	7	275
August „	6	151
September „	3	77
October „	6	190
November „	8	684

MANURIAL EXPERIMENTS.

On these blocks, each of which contains one-quarter of an acre, the experiments have been carried out continuously. In 1915 the crops were practically a failure; nevertheless the returns are included in the averages given.

It will be seen that superphosphate at 1 cwt. per acre is the only manure which gave a slightly better financial return than the unmanured blocks.

The preparation of the seed-bed necessitated two cultivations with disc cultivator and two harrowings prior to seeding. Ploughing was not necessary, as practically no consolidation of the soil had taken place since the last was done.

Sown, May; variety, Bunge No. 1; quantity seed, 2½ pecks (1914 grain), treated with 2 per cent. solution bluestone as a smut preventative; germinated, 6th to 8th June; earing, first week September; ripe, third week October; harvested, last week October.

Block.	Manure Applied.	Cost. £ s. d.	Yield.	Average. Seven Years.	Remarks.
1	Shirley's No. 1 Cereal Manure, 1 cwt. ..	0 11 0	29·5	20·4	Crop thin ; stout straw ; free from rust ; ears well filled. Through the proximity of obstacles it was necessary to turn over on this block with harrows, which resulted in the destruction of a goodly portion, thereby interfering with results.
2	Shirley's No. 1 Cereal Manure, 1 cwt. per acre ; ½ cwt. nitrate lime	0 17 9	29·2	21·6	Crop medium ; thin straw ; fairly tall ; heads large and well filled ; traces rust ; grain slightly pinched.
3	Shirley's No. 1 Cereal Manure, ½ cwt. per acre ; ½ cwt. nitrate lime	0 12 3	29·8	22·6	Remarks as applied to No. 2.
4	Control (unmanured)	..	30·1	18·7	Crop medium ; thin, even straw ; medium length ; fine heads, well filled, and slight traces rust ; very little flag; grain slightly pinched.
5	1 cwt. superphosphate	0 7 0	31·2	21·0	Crop even, medium length ; very little flag ; straw fairly fine ; slight traces rust.
6	Thomas's Phosphate	0 5 6	30·4	19·4	Crop slightly uneven ; unequal ripening ; more flag than Nos. 4 and 5 ; traces rust ; grain slightly pinched.
7	Stable manure ; superphosphate, ½ cwt. ..	0 3 6	24·9	19·6	No manure (stable) applied. Crop grew too flaggy ; stooled very well ; straw short ; crop on the whole badly affected by dry weather and rust. As in the previous season the ears were badly tipped and failed to emerge from the shot blade.
8	Superphosphate, 1 cwt. ; nitrate of lime, ½ cwt.	0 13 9	28·4	19·2	Earing uneven ; crop on the whole uneven, due to inequalities in the soil. Patches where crop grew flaggy produced pinched grain, possibly due to dry weather and effects of rust.
9	Nitrate of lime, ½ cwt. ; superphosphate, 1 cwt. ; sulphate of potash	1 1 9	29 ·5	17·9	Remarks as applied to No. 8.
10	Superphosphate, 1 cwt. ; sulphate of potash, ½ cwt.	0 15 0	30·6	19·7	This experiment should have included dried blood, but it was unprocurable. Crop uneven, but more even than in any previous season. Where crop was flaggy it suffered from dry spell and produced pinched grain ; traces rust.
11	Unmanured	..	28·9	18·4	Crop uneven, but inequalities not so marked as usual. Straw medium length ; medium stout ; traces rust.
12	Thomas's Phosphate, 1 cwt. ; sulphate of potash, ½ cwt. ..	0 14 6	29·8	20·4	Crop uneven, ranging in height from 3 ft. to 5 ft. ; fairly flaggy ; inclined to be rusty ; grain slightly pinched. Blood should have been included in this experiment.
13	Sulphate of potash, ½ cwt. ; superphosphate, 1 cwt. ; nitrate of lime, ½ cwt.	1 1 9	30·6	20·6	Remarks as applied to No. 12.

MAIZE CROP PROSPECTS IN THE BOONAH DISTRICT.

In a report dated 5th February, submitted by Mr. W. H. Bechtel, Field Assistant, in reference to his recent visit to the Boonah district, attention is drawn to the fact that the August, September, and October sown maize crops made very satisfactory progress, and give excellent promise of bountiful returns of grain; a number have been harvested, but a spell of bright, sunny weather, to admit of handling the main crops, is now required. It is noteworthy that late-sown crops are not doing at all well, and fully 75 per cent. of these are backward and stunted owing to the presence of what is locally termed "blight." Speciments of affected plants have been submitted to the Government Pathologist (Mr. Henry Tryon). From present appearances many of these late-sown crops will be a complete failure. Others may possibly set a small proportion of grain, but the position at this stage is not at all satisfactory. Mr. Henry Tryon's remarks on the subject of the affected crops are as follows:—

"Maize.—Disease affecting late-sown (December-January) crops in the Boonah district: This malady is one that does not appear to have come under the notice of previous workers. It is termed by me—in earlier reports—'Maize Hyperplasia.' It is a disease affecting particular cells of the leaf-tissue; these becoming exceedingly enlarged, without any great numerical increase, the energy of growth being diverted for their formation instead of being utilised for increase in size, &c.; hence the linear series of little swellings (intumescences) in the foliage. This trouble, I have been led to conclude, is physiological and non-parasitic. Therefore I have found it to occur in a particular period in the plant's growth when abundant rainfall is experienced, water-logging the soil; and in such a way as to suggest that it has a meteorological origin. Its prevention, therefore, is a matter involving proper agricultural method."

THE IMPORTANCE OF SOIL VENTILATION.

A very instructive article on this subject appeared in the "Agricultural News," Barbados, of 2nd December, 1916. The writer points out that when considering the composition and structure of a fertile soil, we are apt to overlook the fact that air is a constituent part just as essential as water or plant nutrients. Air supply has never taken definite shape in soil science to the extent water supply or plant-food has, and consequently an important field of investigation appears to lie practically untouched. It is true that drainage in relation to soil ventilation is appreciated, as well as methods of cultivation that go to produce a good tilth, but that does not teach us anything; it gives us no definite clue as to what the roots of different crops require, or whether air supply might not be more scientifically adjusted to suit the roots of different crops, and the beneficial bacteria that function under similar conditions in the soil. If, under certain circumstances, it were found desirable, it should be quite practicable to supply the soil with air by more direct means than by cultivation and drainage, just as we know it is practicable to supply the soil with plant-food in the form of chemicals instead of relying upon weathering and the decay of organic matter.

Then considerations suggest a new aspect of land culture, namely, constructive soil ventilation—a definite branch of agricultural engineering associated with drainage.

[In 1908 a Bundaberg sugar-planter spent a great deal of money in draining a large sugar-cane field, and after the work was done, no rain came, and neighbouring planters laughed, for no water came through these drains, and they said he had wasted his money. But, as the cane grew, it was noticed that during all the dry weather that season, when everybody's cane was drooping, and scarcely growing at all, the cane on this drained land kept on growing, and the canes held up their light-green heads, above all other canes in the district, and the crop was nearly double that on the other plantations, although there had been no rain and not a drop of water ran through the drains. The reason was that the moisture from below rose through the warm, well-aired loose soil, and the cane roots went down to meet it, and so they stood the dry weather and grew quickly.—Editor, "Q.A.J."]

Before proceeding to enlarge upon this idea, it will be well to consider what evidence exists to justify it.

The importance of soil ventilation has been brought out prominently by the observations of Howard in India. He has pointed out that crops undoubtedly differ greatly in the amount of air their roots require. In India, for example, Gram requires a great deal of air, and only a moderate amount of water. In some parts of the country, the conditions, both natural and artificial, are such that the roots get plenty of air. Here this particular crop thrives, but in other places, where, for instance, irrigation conditions obtain, Gram will not grow successfully. Howard maintains that the proper provision of air to the soil is all that is necessary for extending the cultivation of this useful crop. The facts are the same in regard to the cultivation of Indigo. This crop is largely cultivated on the higher levels in rice-growing districts. The occasional flooding of these higher levels due to the rise of the rivers is the cause of the low yields obtained in India compared with those obtained under drier conditions in Java.

The two crops just referred to are of course leguminous, and the detrimental effect of insufficient air is partly due to the limited supply of nitrogen available for fixation by the nodules on the roots. But that is only partly the reason; bad aeration has a general retarding influence upon root development. Howard has noticed this even in the case of wheat, which is a crop that can be successfully grown on very heavy land. Experiments conducted at Pusa show that the best-grown wheat can be raised only on soil that is well aerated. Lastly, rice which grows in swamps is unable to thrive without a supply of oxygen for root development. This is obtained through the surface film of algae and other green organisms on these soils. Certain cultural operations after harvest also help to conserve a store of oxygen in the soil subsequent to the arrival of the rains.

Other crops in other parts of the world are equally susceptible to anaerobic conditions in the soil. In regard to cotton, we know that this plant thrives best on soils of open texture, and that the principal cause of boll-shedding is root asphyxiation, proved by Balls, in Egypt, and

fully supported by observations in the West Indies. Cacao is extremely sensitive to clay. That may be because cacao is naturally a deep-rooting plant and the clay offers mechanical resistence to the extension of the roots; but it is also likely to be due to the fact that a clay soil contains less air than a light soil. It is not merely a clay subsoil, but a clayey surface soil that has an adverse effect on the growth of cacao.

Coconut trees are very sensitive to inadequate aeration. They will thrive only on land that is well drained either naturally or artificially. No harmful effect is produced on the roots by the presence of water; coconuts will thrive in saturated soil provided the water is continually moving. This is a very significant fact concerning the physiological importance of soil aeration.

In view of all these facts, which come within the range of observation of the planter himself, it will be admitted that soil aeration demands greater attention than it has received. The significant fact is, that air is the limiting factor to the efficiency of water supply. Beyond a certain point, water is wasted in the soil if it is not aerated.

Turning more particularly to the physiology of roots, it is very desirable to know more concerning their respiration. Respiration has been studied almost exclusively in regard to the parts of the plant above ground, and the generalisations have been extended to apply to the roots. But it does not seem justifiable to assume that the manner in which roots breathe under the complex conditions, both chemical and physical, of soil environment is the same, and follows the same laws as those parts of the plants exposed to the comparatively simple environment of the atmosphere. There is probably a difference in the rate of respiration of the roots of certain plants, and, as already suggested in this article, the growth of certain crops might be stimulated by the artifical introduction of air into the soil.

Constructive soil ventilation as an established branch of agricultural engineering presupposes successful researches into the air requirements of roots and soil organisms. The desirable conditions in different cases having been determined, it should then be possible to establish them.

The methods of effecting soil aeration artificially would come within the province of the engineer. Possibly one method would be to lay down porous ventilation-pipes through which air could be introduced, if necessary, under pressure. In orchard cultivation vertical tubes might be introduced near the trees and air pumped down them periodically. In the light of soil aeration better use might be made of soil explosions with dynamite, to aerate clayey subsoils especially.

Investigation might show that an alteration in the percentage composition of the soil atmosphere would prove advantageous in some circumstances; for example, a high proportion of oxygen might prove beneficial, or in some cases the removal of an excess of carbon dioxide. There is also the question of the possible value of introducing gases other than those that normally constitute the air of the soil. A matter for speculation is whether liquid air could be usefully employed as a soil fertiliser.

Finally, more might be done to bring about a better state of aeration in certain circumstances by means of methods of cultivation. The forking of orchard soils is still a matter of some controversy, and the true value of this operation requires investigation. The ploughing of the soil in coconut plantations gives good results, but its relation to soil aeration is not generally recognised.

"WOOL COTTON."

"Cotton and Cotton Oil News," U.S.A., says:—"A. G. Spiller, a farmer living near Barnesville, Georgia, has grown about 150 lb. of seed cotton this year of what he calls 'Wool Cotton.' He has been displaying the cotton, and it has attracted considerable attention. It has a remarkable similarity to wool. The locks are 4 or 5 in. long, and the yield is said to be heavy on the stalk and in lint. Mr. Spiller asserts that it is boll-weevil proof on account of the toughness of the hull or burr of the boll. All who have examined the cotton agree that it is very unusual, and its development will be watched with interest."

Mr. D. Jones informs us that some Northern and Central Queensland varieties of Mascot types have locks exceeding in length that described, and in all probability a superior class of fibre, and are virtually immune from insect pests. Cotton similar to that described grows "volunteer" all over the North.—Ed., " Q.A.J."

NEW METHOD OF POTATO CULTURE.

In the latest issue to hand of the "International Review of the Science and Practice of Agriculture" (Rome), there is given a summary of an article by a well-known French authority, in which a new method of economic cultivation of the potato is described. This consists in planting budding stalks instead of tubers, and has been tried for several years with good results. The tubers are sorted out and spread in a dry cellar at a temperature above 63 degrees Fahr. if possible. In a few days, before the tubers wrinkle, rooting sprouts are obtained, which must be cut before they reach a length of 8 in. After cutting, they must be planted as quick as possible. The sprouts are planted in twos on ridge sides at distances of 8 by 20 in. at a depth of 2¾ to 3½ in., according to the soil. In a few days the outside part becomes green and puts out one or two stalks, the roots taking hold at the same time. Each planted shoot gives one or two tubers which are seldom very large, but never small; a crop of nearly 8½ tons per acre of marketable potatoes may be reckoned on. The method is applicable to all loose, light, and relatively dry soils. Its advantage is that it leaves for consumption those potatoes which, on the ordinary method, would have been used for planting. The shoots given off by the potatoes on germinating, keep for several days, and can be planted direct, or even forwarded some distance for planting.—"Farmers' Advocate," South Africa.

MARKET GARDENING.

SUGGESTIONS FOR SEED PRESERVATION.

In a Bulletin (No. 20) of the Porto Rico Agricultural Experiment Station, U.S.A., on experiments on the supposed deterioration of varieties of vegetables in Porto Rico, by Messrs. C. F. Kinman, Horticulturist, and T. B. McClelland, Assistant Horticulturist, the following remarks on preserving the vitality of vegetable seed are worthy of notice by both vegetable and flower gardeners:—

"The humidity of the air in Porto Rico is very high, and causes vegetable seed exposed to the open air to lose their viability much sooner than would be the case in a drier atmosphere. The inability to keep seed in good condition is a serious hindrance to vegetable growing. When the experiments herein reported were undertaken, the following method for preserving seed was employed and was very satisfactory. The seed in cotton sacks was placed in airtight glass jars in the bottom of which a few ounces of calcium chloride had been placed. A small piece of wire screening separated the seed from the calcium chloride below. This method is simple and costs little, and is recommended for general use. While glass jars were used in experiments, metal or non-porous earthen vessels will serve as well if made airtight. It must be remembered that the calcium chloride placed in the bottom of the jar is used as a drying agent and not as a preservative in any other sense. Seed such as coffee and citrus, which lose their viability on drying, can not be kept viable in this way. If seed with a fairly high water content is to be stored, it may be necessary to renew the calcium chlorid, since, unless a sufficient quantity of calcium chloride is used to take up the surplus water, the seed may not be kept sufficiently dry. Before the calcium chloride becomes entirely moist, it should be replaced by a fresh supply. In handling it should be exposed as short a time as possible to the open air, since it takes up moisture from the air readily and so loses its drying power. In removing seed from the container this should be remembered.

"In the last germination test of bean seed which had been kept in the open the seed was put in the tester on the 29th October, 1910, germinating 4 per cent. On this date, 100 per cent. of the seed kept in the drier germinated. This seed from the drier still showed a 100 per cent. germination nearly two years later, 13th August, 1912, when the tests had to be discontinued on account of a scarcity of seed.

"By the end of 1911 all of the imported seed kept in the open air had lost its viability. In 1915, 94 per cent. of the radish seed and 84 per cent. of the beet and tomato seed kept in the drier still germinated.

"The native tomato seed, after more than five years in the drier, showed a germination of 93 per cent., whereas seed kept in the open lost all viability in less than half that time.

[The loss of viability of imported seed of a number of different vegetables is graphically shown in illustrations which are not here reproduced.—Ed., " Q.A.J."]

"The very rapid loss of viability of lettuce seed kept in the open air stands in marked contrast with the results of tests of seed of the same

lot which had been kept in the drier and which showed a germination of 90 per cent. in 1915.

"That Northern vegetables degenerate quickly when taken to the Tropics is a common belief in Porto Rico, resulting from the fact that seed loses its viability quickly when exposed to moist air and from a lack of knowledge regarding seasonal effect on vegetable production.

"To retain the viability of seed of the crops used in the experiments here reported, the seed was stored in airtight jars in the bottom of which was placed a small quantity of calcium chloride. This method was so satisfactory that it is recommended for general use."

TOMATO-GROWING.

By WM. McLEAN, Boggabri, New South Wales.

A large number of people from Queensland keep writing to me *re* growing tomatoes. As I know that many of them are readers of your paper, I give them a little information as to the methods adopted by me in growing of same. One thing I notice in articles on tomato-growing is, that all vines are recommended for the same treatment in cultivation. This, I find in many cases, is a mistake. I wish to point out that some varieties make very little vine and can be allowed to trail on the ground with satisfactory results, while others that are strong growers and require to be let grow tall so as to bear heavy crops of fruit, must be trained up or staked to get good results. I always stake the following, and let them run 6 ft. to 8 ft. high, and often more:—Ferris Wheel, Giant Tree, Yellow Ponderosa, and Colossal. These kinds must be trained up or staked to get good results, as the fruit is so large that the limbs will get broken, and most of the largest fruit will be on the ground, on half broken limbs, the large fruit making it impossible for the limbs to bear them up, and, unless trained up, staked, or given support, good results cannot be expected.

The Ferris Wheel, Giant Tree, Colossal, and Yellow Ponderosa are the largest I have ever imported, while the Yellow Ponderosa is the smallest of the four, but a very strong grower and a heavy cropper, and a splendid shipper. The fruits will keep in good condition on this variety longer than any other variety I have ever grown, and run very even in size. I have about sixty different kinds on trial this season, collected from India, South Africa, New Zealand, and different States of America, while I am trying also a number of our leading varieties to see how they correspond with the new imported ones. By keeping the vines of all large kinds staked or tied up, the yield is much better. It keeps away grubs, and prevents rot, if very wet, and in a hot climate, like where I live, prevents sunscald. I have had a few very hot days this summer, with the thermometer from 100 to 110 degrees in the shade. Many tomatoes on the vines that were allowed to trail on the ground got sunscald, while not a single one was touched on the staked vines. I don't care for the single-stem system in my climate, as it is too hot. I let my vines throw out a number of shoots, so that they may grow

into a large bush, as it keeps the fruit well shaded in the hot weather. I also draw the earth well up to them, when the plants are about 8 in. high, or a little less, and then do the same again when the plants are starting to shoot out suckers. I have about 3,000 vines growing this season.

The following do better if staked or trained up if convenient:—Burpee's Improved, Matchless, Snowball, Golden Sunrise, Wood's Imperial Beauty, Five Million Dollar, John Bair, and Bonnie Best (South African strain). I wish to mention that the Snowball is a white tomato, but may vary, in different soils and under different climatic conditions, towards yellow or straw colour, but all the same, if it does, it is large and a beautiful tomato. This tomato makes very little vine with me, but bears very large fruits, and unless the vines are staked or trained up a great number of the main limbs will get broken off, and half the fruit are destroyed.

SOME FINE TOMATOES.

During the past two or three months, the fruits and vegetables in various parts of Queensland have excelled in size and weight anything which has, except in rare instances, been in evidence in former seasons. Within the last three months we have seen peaches weighing 1 lb. each, onions 2 lb., bananas 9 in. long and 5 in. in circumference, and in the

PLATE 6.—SOME FINE TOMATOES.

middle of February, a banana-grower is reported to have produced bananas, each fruit weighing 1 lb. Now we have a specimen of tomatoes grown by Messrs. C. Tutton and Sons at Cloncurry, photographed by Mrs. Chas. Tutton. The photograph shows five tomatoes, the combined weight of which was 11 lb. 4 oz. It would be of interest to know if any particular methods of manuring, pruning, &c., were employed in producing this magnificent fruit, which, from the photograph, might easily be mistaken for table pumpkins.

NEGLECTED INDUSTRIES.

PEANUTS.

Notwithstanding all that has been written in this and hundreds of other agricultural journals throughout the civilised world on the great value of peanuts both as a food for stock and for the production of oil, few farmers have, in this State, devoted any attention to it as a farm crop. In Hawaii, the United States, Japan, Russia, China, and other countries, peanuts are grown largely as a staple crop. They are consumed in large quantities by the inhabitants of those countries both in a raw and roasted state. In the Southern States of the Commonwealth the crop is produced in fairly large quantities with considerable profit to the growers. A farmer in Victoria, Mr. Bunbury, of Ballendella, known as the "Peanut King," estimates that as much as £350 per acre profit may be earned by growing peanuts. The wholesale price of these nuts, he said, was 6½d.* per lb., and, despite importations from Japan, the demands of the Australian markets are not properly filled. He stated that when he marketed his first crop in 1914, he disposed of a large portion of it at 1s. per lb., and it was his opinion that, even if nuts were to fall to 1d. per lb., a grower could make a profit of £27 per acre.

The total area of land under cultivation in Queensland amounted in 1915-1916 to 1,059,401 acres besides 329,813 acres in fallow, or lying idle. Out of that area only 102 acres are returned as being under peanuts, which yielded 85,864 lb. of nuts—12,980 lb. in the Moreton district, 27,219 lb. in the York Peninsula, and 41,700 lb. in the Port Curtis district. The money value of these crops at 6d. per lb. would be about £2,146. An

* The price of peanuts at present, in Queensland, is about 3d. per lb., and although 6½d. per lb. was obtained by the Victorian farmer, the Queensland farmer would have to pay freight and other charges to Sydney or Melbourne, which would reduce the net return to the grower. At the same time, where he now sells 1 cwt. he would dispose of tons in the Southern markets, provided he can produce an even, bright-coloured, clean sample, such as can always be turned out from a light, sandy loam.—Ed., " Q.A.J."

acre of peanuts will yield from 1,500 to 2,000 lb. of nuts. At one of the Queensland State Farms, the return per acre in 1914 was 2,420 lb.—£60 worth at 6d. per lb.

Six years ago there were in the United States of America, as in Queensland to-day, only a few experimental plots in one county. The estimated area in that county in 1914 was 15,000 acres and other counties have followed suit. The major portion of the crop is devoted to pig-feeding and oil-making. For the former purpose the peanut is far preferable to corn, when fed in conjunction with other foods, in promoting rapid growth and considerably increased weight as compared with results from other food. Professor Cottrell (a pig-raiser in Texas, U.S.A.) has shown that it requires less than 3 lb. of peanuts for each 1 lb. of gain on pigs that weighed from 40 to 50 lb. at the start. At Arkansas Experiment Station, an acre of ripe peanuts pastured by hogs made 1,252 lb. of gain, while an adjoining cornfield, yielding 30 bushels to the acre, only made 436 lb. of gain per acre on hogs. Now we have been asked, "Where is there a market for large quantities of peanuts?"

We have just received a letter from Messrs. A. H. Burnet and Co., Limited, merchants and wholesale grocers, Australia House, Sydney, N.S.W., which answers the question. This firm writes: "There is a very fair market in this State for peanuts, and large quantities are bought, especially by the Chinese merchants who import them from the East. We would give the whole of our trade to the Australian producers if they will market them in a satisfactory way." The firm also states that if any growers are willing to grow with the idea of marketing in New South Wales, they will see other members of the Merchants' Association there with a view of giving the growers an idea of the quantity the association would be prepared to take. Prospective growers would naturally ask what price the New South Wales merchants would be prepared to pay for nuts, but the firm did not name any price. In any case, the question of freight from Queensland to New South Wales would have to be considered.

NEW USE FOR COCONUT WATER.

Coconut water or, as some call it, "milk," which hitherto has been a waste product in copra-making countries, has been found to be an excellent rubber coagulent. The discovery has been lately made in Ceylon. Millions of gallons of coconut water allowed to run to waste on coconut plantations can now be made use of at a good profit. The coconut water is allowed to ferment for four or five days, after which it can be used without further delay as coagulating latex. This is said to produce a fine rubber, superior to that procured with the use of crude acetic acid. The colour of the rubber with acetic acid fermentation is decidedly inferior to the coconut water fermentation. Coconut water is now made up in bulk and shipped in large quantities from coconut plantations to the various rubber estates.—"Town and Country."

Pastoral.

THE BLOW-FLY PEST.

By W. G. BROWN, Instructor in Sheep and Wool.

About one of the best suggestions which has come before me lately in regard to the tratment of sheep as against the blow-fly, is made by Mr. P. O'Sullivan, of Charleville.

In the "Courier" of the 16th February, that gentleman states (*inter alia*)—

" . . . . There is an old saying that 'Cleanliness is next to godliness.' The proverb might apply in this case. If the sheep on all stations were washed, say, in the beginning of the summer months—as was the case some forty years ago—it might relieve the trouble. The process was as follows:—First, the sheep were put through a hot water soak tank for about twenty minutes, then they were run through a race, and placed under cold water spouts, being afterwards allowed to swim through another square tank to a drying trellis pen, thus cleansing the dirt and grease out of the wool. The fly was never known to attack the sheep treated in this way. With the advantages of bore water the wool could be made very clean and bright. On Tarong Station, in the Burnett district, in olden times, when that magnificent property carried a good flock of sheep, a woolwash was in existence there, and was erected on the principle I refer to. Some eight horses were driven in a circular 'merry-go-round' whim, which worked machinery that operated eight to ten spouts, from which the water would gush in a goodly stream at a terrific pace. Men would stand up to their waist in the water, holding each animal sufficiently long to scour the fleece, then let the sheep go, and it would swim to the drying pen, wearing a beautifully clean, white appearance. This, I think, would be almost a sure safeguard against the invasion and vicious attack of the fly. Of course, the plan I state could be worked now on a more modern, up-to-date, and scientific system; for instance, it might not be necessary for the men who would be operating to stand in the water. Some appliance could surely be devised to do that work."

Now, there is more than a grain of common sense in Mr. O'Sullivan's suggestion. It is well known that, generally speaking, light, dry-woolled sheep and crossbreds are not nearly so subject to the attention of the fly as the dense-woolled, greasy wools of the latter-day merino. In the departmental experiments of 1914-15 the sheep dipped showed a greater relative immunity than the undipped, the non-poisonous dips themselves showing out fairly well in the analysis. I am of opinion that the cleansing effects of the dipping itself had more than a little to do with the results at the end of the twelve months' trial. Not only was there

a big difference (53·17 struck of the undipped, and 18·72 of the dipped), but the wool, when sold by Messrs. Fenwick and Co., in the open market, and classed only as dipped and undipped wool, showed a balance in favour of dipped wool of 3d. per lb. (*vide* "Queensland Agricultural Journal" of January, 1915). The dipping was done by means of a Tandawanna shower, which is established at Gindie State Farm. It is calculated that the amount of dip solution falling from a height of about 7 ft. for the six or seven minutes the sheep were under the shower, was equal to a fall of 10 in. of rain over the area of the pen holding the animals. Thus the sheep received a great washing—not as cleansing a washing as hot water and soap would give, but still fairly effective. For the ten months after the dipping, the undipped sheep could be distinguished without handling, merely by the difference in the tips of the fleece, one being much cleaner and brighter than the other. With bore water the process of washing the sheep by means of the shower would be comparatively cheap and easy. The sheep would not be knocked about; and, if soap and water were desired, there would be little waste, as the liquor could be used almost *ad lib.* in regard to time during which it was flowing. As is well known to scourers, the greater the number of fleeces washed in the first liquor, the better the liquor becomes for cleansing purposes.

The matter will certainly be tried out in the experiments about to be conducted at Gindie, and I have to thank Mr. O'Sullivan for the suggestion which, I confess, should have been obvious to everybody concerned. The gain, besides, would be enormous in a dozen ways which are known to wool and sheep men.

LIVE STOCK IN THE UNITED STATES OF AMERICA.

Official figures state that there are, in the United States of America, 21,262,000 milch cows, 37,067,000 beef cattle, 49,956,000 sheep, 64,618,000 pigs, and 21,195,000 horses.

A NEW METHOD OF BRANDING.

An original and admirable idea in branding has been placed upon the market by Mr. James Robinson, the well-known maker of ear-tags and ear-punchers. The object is to brand on the inside of the ear, thereby obviating the destruction of the hide which accompanies the usual system of branding. Branding on the horn has been tried as a means of obviating the drawback of the usual system, but this has been found to come out in a year or two. Tags have been introduced from the United States, but these, too, often tear out, while tattooing grows indistinct. Several pedigree cattle breeders who have tried Mr. Robinson's system are thoroughly satisfied with it. It certainly meets a long-felt want.—"New Zealand Farmer."

The Horse.

TREATMENT OF SMALL WORMS IN HORSES.

The Chief Inspector of Stock and Chief Government Veterinary Surgeon, Department of Agriculture and Stock, Mr. A. H. Cory, M.R.C.V.S., advises —

Sclerostoma tetracanthum.—This is a small thread-like worm about ½ in. long, found chiefly in the large bowel in great numbers. The embryos encyst themselves beneath the mucous membrane. The countless wounds which the worms make in the bowel and the irritation caused by the encysted larvæ give rise to enteritis, &c. There is usually associated with this worm another known as the *Sclerostoma equinum.* This worm is about 1¼ in. to 1½ in. long, grey or reddish-grey in colour, with a round knobbish head, and tapering to the tail end. The embryos wander into the blood-vessels, causing obstructions, giving rise to grave complications.

Treatment.—All suspected animals should be purged by administering a dose of physic such as 5 to 6 drachms of powdered Barbados aloes, with 1 drachm of powdered ginger given as a drench in a pint of thin gruel, or made into a ball with a little soft soap. After the action of the purgative has ceased, they should be given every day, about one hour before their morning feed, the following powder mixed in a couple of handfuls of damped food:—Antimony tartrate, 2 drachms; powdered sulphate of iron, 1 drachm; powdered gentian, 2 drachms; powdered aniseed, 3 drachms.

After six doses they should be given a second active purgative; for the smaller horses and ponies not more than 5 drachms of aloes, and 1 drachm antimony tartrate should be given. During the treatment the animals should be kept yarded to prevent the contamination of pastures by excreta, which should be gathered up and burnt and the ground dressed with common salt or quicklime. As infested animals cannot by one course of vermifuges be divested of the larvæ in the cysts and blood-vessels, they should be treated at intervals of two or three months. More important than medication is the exclusion of embryos from food and water.

Wherever the *Sclerostoma* have secured a local habitat the land should be put under a rotation of crops to be laid down in grass again after four or five years; the *Sclerostoma* ova will by this time have hatched out and died a natural death. Where this is impracticable change the horses to other pastures and depasture the infested land for several years by cattle or sheep which do not harbour the *Sclerostoma*; in all cases it must be provided that no drainage can come from infested pastures to the clean pastures. Rock salt left in the paddocks for the horses to lick will greatly minimise the chances of infestation.

[Note.—A correspondent informs us that he tried feeding some horses infected with worms on sunflower leaves, with the result that in three weeks the animals were entirely free of worms.—Ed., " Q.A.J."]

The Orchard.

THE CINCTURING OR RINGING AND GIRDLING OF FRUIT TREES.

By CHARLES ROSS, F.R.H.S., Instructor in Fruit Culture.

Some considerable attention has been given to this subject, which has been favourably commented upon from time to time, and a few remarks from myself in reply to many inquiries may not be inopportune.

The method has long been practised in all grapegrowing countries. The cincture consists of removing a narrow ring of the outer bark without injuring the inner fibrous tissue or cambium layer along which the sap rises to the superstructure of the tree. The return sap is thereby checked at the ring, and, instead of proceeding to the roots and causing more wood growth, it is elaborated in the blossoms, leaves, and fruit. The effect is to produce a more regular and better bearing habit, the fruit being earlier, larger, and richer in flavour and colour; and, what is also important, the fruit is not so liable to drop off after setting. The best time to ring or girdle is when the sap is in full flow, or when the petals are beginning to fall; if done later, the operation is useless for increasing the setting, but will ensure an earlier crop of better quality. I have advocated this system for many years, but until recently it has not been much followed. Where I have recommended it, and induced growers in the North Coast, Central, and Southern districts to try it, the result of the operation has proved all that has been claimed for it. A sharp knife may be used for removing the ring, but it can be done more quickly by the instruments figured in the illustrations (Figs. 19 and 21). Unfortunately this tool is now difficult to obtain, as it is of French manufacture.

In England, during my more youthful days, cincturing and girdling were performed on grape-vines grown under glass, and upon pears and other deciduous fruit-trees grown in the open, known to be shy croppers and late in maturing. Girdling with fine wire was even performed on hard-wooded, flower-bearing shrubs, such as roses and camelias, with more or less success for exhibition purposes; also to ensure a better setting of the seed heads after the flowers had been hybridised. In our own State there are many erratic and shy-bearing fruit-trees that will give a satisfactory response to the treatment, which has already been proved on mangoes, Washington Navel oranges, walnuts, peaches, pears, apples, grapes, &c. The method is well worth trying upon other fruits which have not yet been experimented with, more especially those varieties that are shy or erratic bearers; also

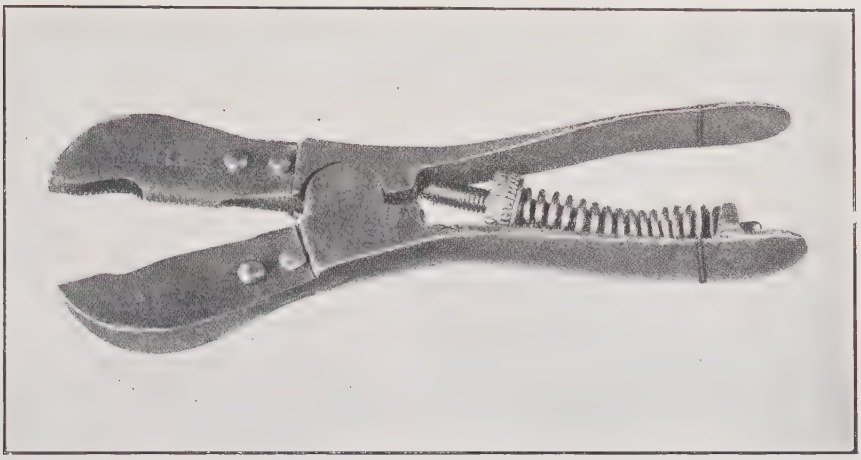


Plate 7.—Cincturing Tool.

Plate 8.—How to Use the Instrument.

such as, under ordinary conditions, require age before assuming a free cropping habit: for instance, the Ahuacate (Avocado or Alligator Pear), Pecan Nut, Cherimoya, &c.

Girdling is performed by twitching a piece of No. 8 or No. 10 wire very tightly round the trunk, or, say, half the main limbs or smaller branches; but if the stems are not perfectly cylindrical, the wire must be hammered in all round, otherwise the cavities would be bridged over by the wire, under which the sap would continue to circulate freely, and therefore would not answer the purpose. There must be a complete check of return sap all round the circle. The girdle is never so complete a check as the cincture. My European experience long ago was to select a number of limbs or branches (not all) on each tree or vine for the purpose, rather than ring the main stem, but the latter has been operated on here with the utmost satisfaction.

In this connection I desire to draw the attention of fruitgrowers to the following, which appeared in "The Fruit World" of last month (February):—

"RINGING FRUIT TREES.

"The practice of removing a complete ring of bark from fruit-trees has been followed by Mr. W. H. Hughes, of Longwood, writes Mr. Geo. Quinn, Horticultural Instructor, South Australia. Mr. Hughes practised the system on some trees of the Nickajack variety some ten years ago. He put two cuts, ⅛ in. apart, through the bark of the trees, and removed the strip between the cuts. The operation was performed when the blossom began to fall. It was important, Mr. Hughes considered, that the cuts should not be deeper than through the bark, and, if the weather were warm, he advised tying a strip of bagging over the wound to protect it from the rays of the sun. At the time the first test was made, one tree of a lot of eight was chosen for treatment. The treated tree yielded more fruit the season directly after treatment than was gathered from the remaining seven untreated. Needless to say, these were subjected to ringing the next year. All the treated trees are still bearing well. However, Dunn's Seedlings were also treated, but not successfully.

"Mr. J. Roebuck, also of Longwood, ringbarked a Gravenstein Apple in the limbs ten years ago. Prior to treatment it had not averaged a return of one case per year, but immediately succeeding the ringing it yielded thirteen cases, and since then has returned an average of nine cases annually.

"A vigorous growing Northern Spy Apple was ringbarked by Mr. W. Nicholls, and the result was very satisfactory."

The operation as performed in the present day may not have been known, but the principle of checking the flow of sap by bruising or beating the bark of trees must have been crudely understood hundreds of years ago (*vide* the following very ancient couplet):—

"A woman, a dog, and a walnut tree,
The better you beat them the better they be."

PICKLING GREEN AND RIPE OLIVES.

Although olives have been grown for some years in different parts of Queensland, there has never been a systematic production of the pickled olive. At St. Helena Penal Establishment, in former years, very excellent olive oil was made, but owing, we believe, to the fruit-fly pest, oilmaking was given up. Some time ago we published in this Journal a very excellent paper on pickling olives, by W. Calton Grasby, and as olives are now ripening, we republish the directions for pickling both the green and ripe fruit, as possibly some owners of olive trees in bearing may like to make a trial of the process.

The directions for green olives are taken, with a few slight modifications, from a bulletin prepared by Frederick T. Bioletti, at the College of Agriculture, University of California, in 1901. They are the result of a series of experiments conducted at the Agricultural Experiment Station to determine the best method of preserving the green colour of the fruit, and at the same time give a good-quality pickled green olive.

TO PICKLE GREEN OLIVES.

Choice of Fruit.—Only large-fruited varieties should be chosen, as the small green pickles bring a very inferior price. The olives should be gathered as soon as they have reached full size, and before they have coloured notably. A slight pink colour on one side does no harm, as it disappears during the process, but olives which have reached the stage of ripeness indicated by this first change of colour will probably have less of the bright green than if gathered earlier. No two varieties should be pickled together, and the olives should be graded into three or four sizes. The reason for this is that different varieties and different sizes are almost sure to require different strengths of lye solution, and it is therefore impossible to attain the best results unless this selection is made. The proper strength of lye solution to use in each case is best determined by a preliminary trial, as follows:—

Preliminary Trial.—Take a series, say four, of pint preserving jars, and fill them with the olives to be tested. Pour into them respectively a 1 per cent., 1½ per cent., 2 per cent., and 2½ per cent. lye solution, sufficient to cover the fruit. At the end of forty-eight hours examine them. (It has been found that a sufficiently strong lye solution will extract the acid and bitter principles of even very bitter olives in forty-eight hours.) At the end of this time some of the weaker lye solutions will be found to have neutralised—that is to say, all the lye will have been used in acting upon the acids of the fruit. This will be made evident by the lack of the slimy feeling which the fingers have when dipped into a lye solution and rubbed together. Suppose that the 1 per cent. and 1½ per cent. solutions are neutralised, and that the 2 per cent. still has a slight slimy feel, this will show that a 2 per cent. solution is a little stronger than is necessary to neutralise all the bitter or acrid matter in the sample tested. If, now, we use a 2 per cent. solution in curing the bulk of the olives from which the sample was taken, we are able to preserve the green colour perfectly. If we use a somewhat stronger

solution—say, a 2½ per cent.—the colour will bleach out a little; while, if we use a much weaker solution—say, a 1 per cent.—the green will change to that disagreeable grey or brown which we wish to avoid.

Process.—The appropriate strength of lye solution having been determined, the olives are placed in convenient receptacles, where they can be treated with a minimum exposure to light and air. For this purpose, 50-gallon barrels with very large bung-holes (4 or 5 in. in diameter) and spigots are useful. After filling the barrels with olives, the lye of the strength determined in the preliminary trial is poured in. Each barrel should be quite full of olives, and sufficient lye solution be put in to come flush with the bung-hole. At the end of forty-eight hours, the lye should be drawn off, the olives quickly washed in two changes of water, and the barrels filled immediately with a 2 per cent. salt solution. This brine should be replaced successively with a 4 per cent., 8 per cent., and, finally, a 12 per cent. solution, in the last of which the pickles remain permanently. The successive brines should be allowed to act for from forty-eight to seventy-two hours each, according to the size of the olives, the larger size requiring more time for the brine to penetrate and to displace the excess of lye which remains. The whole process will thus take from ten to fourteen days.

Absence of Air.—The essential part of the process is to avoid exposing the olives to the air during pickling, until all the bitterness and acid are completely neutralised by the lye. After this, the green colour seems to be fixed, and exposure to the air does not change it much, though it is well, all through the process, to avoid leaving the olives uncovered by liquid any longer than necessary.

As different varieties of olives, and even the same variety in different seasons and from different localities, differ very much in bitterness, the importance of treating each variety separately is evident, as each will require lye solutions of different strength to neutralise them. Very bitter olives—such as Mission, Sevillans, Manzanillo, and True Picholine—require solutions containing from 1½ to 2½ per cent. of pure potash lye, while olives containing little bitterness, such as Ascalan and Columbella, require only from ½ to 1 per cent. solutions.

To facilitate the preparation of lye solutions, it is convenient to remember that an English standard gallon of water weighs, approximately, 10 lb., so that to make a 1 per cent. solution of Greenbank's concentrated lye, use—1 lb. lye in 10 gallons water; ½ lb. lye in 5 gallons water; or ¼ lb. lye in 2½ gallons water. To make a 2 per cent. solution—1 lb. lye in 5 gallons water; ½ lb. lye in 2½ gallons water; or ¼ lb. lye in 5 quarts water.

Those who do not care to go to the trouble of the preliminary tests are advised to use a 2 per cent. solution of lye, and watch and taste the olives to see when the bitterness is removed. They may or may not get the best colour, but they will be able to make a pickled olive of excellent quality.

TO PICKLE RIPE OLIVES.

The olives are best when fully ripe, but yet firm, and they should be picked carefully and not bruised. Olives of any degree of ripeness may be used, but all treated in one operation should be of the same degree of ripeness, of the one variety, and of uniform size.

Put the olives in 2 per cent. lye, and allow to stand twenty-four hours. Wash well for twenty-four hours, changing the water three or four times. If the bitterness has not gone, add 1 per cent. lye solution, and let stand for twenty-four hours; then draw off the lye, and replace with a 2 per cent. salt brine and again allow to stand twenty-four hours. Draw off this brine and replace it with another of the same strength. After forty-eight hours again change for fresh brine, and test for bitterness. If this has gone, use a 4 per cent. brine and allow it to remain four days, and then change the brine for fresh, of the same strength, for seven days. Then change for a 10 or 12 per cent. brine, and the olives will keep indefinitely, but may mould on top. To prevent this, either cover the contents of the vessels with a layer of olive oil, or, better still, pasteurise the vessels and the olives by treating them up to 180 degrees Fahr. for twenty minutes, sealing with pasteurised corks or stoppers.

ANOTHER METHOD.

Place ripe olives in a jar or cask, and cover with a 1½ per cent. lye solution and 2 per cent. salt solution. Allow to stand for forty-eight hours. Draw off the lye and add 2 per cent. brine for forty-eight hours. Change the brine, still using 2 per cent., and allow to stand for three or four days; then repeat the operation, allowing to stand four days. Draw off the brine and cover with a 4 per cent. brine for a week; then change, and use an 8 per cent. brine for another week; then draw off the brine once more, and place the olives in jars or bottles with a 10 to 12 per cent. brine, and pasteurise.

PRACTICAL HINTS.

For a small quantity of olives, procure a barrel-shaped earthenware jar, holding 5 gallons. Insert a spigot into the hole on the bottom side, and on the top let there be a circular hole about 3 in. in diameter. The spigot, of course, is for withdrawing the lye, water, and brine. A small 3 or 5 gallon keg will answer the same purpose. Nearly fill the jar or keg with olives. Then pour in the lye and cover the hole with a piece of board to keep out the light. At the proper time, as given previously, run out the lye and pour in water to rinse the olives, and repeat the operation as already described. By keeping the top carefully covered, there need be no haste in finally bottling the olives, for they will keep for months in the keg. Brine should be boiled, and that added last should be almost boiling hot, and should well cover the fruit, a film of oil being poured on top. Any mould should be removed at once and the olives treated with fresh hot brine and pasteurised. If the olives are too salt when opened, a soaking in fresh water for a day or two will remove the excess of salt without detriment to the olive.

Viticulture.

THE WINE INDUSTRY.

By G. A. GATTINO.

CONSERVATION OF THE WINE IN THE CASKS DURING THE FIRST YEAR.

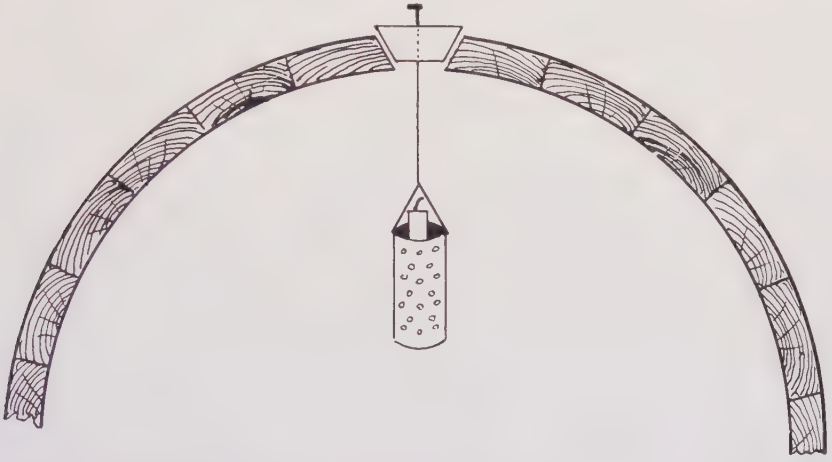
The tumultuous fermentation brings to the must such alterations as will totally change its nature and cause it to assume the qualities of the wine. At this point, however, the must has not yet acquired all the wholesome tonic and resistant characters that are required in the wine, nor has the fermentation ceased. When, after the tumultuous fermentation, the must is taken away from the dregs and transferred into other casks, continuous successive transformations will occur until the must becomes matured wine. That the wine will always go through continuous changes is proved by the fact that after each transfusion or decantation, you will always find that more or less sediment is left in the vessel from which the wine has been transferred. This deposit demonstrates that chemical reactions occurred in the wine in succession, causing the precipitation of insoluble matters. When the wine is bottled, these reactions still occur, and small sediment will always be found in the bottles. The fact being established that the wine, after the tumultuous fermentation, is still subject to transformation, it is necessary to regulate and complete these transformations with care and diligence, and so bring the wine to perfection. The must being transferred, will, after a while, work again, arriving at the phase of the insensible or slow fermentation. If the conditions are propitious, these slow fermentations will last from twenty-five to thirty days. During this phase the wine will improve effectively, and on account of its transformations will be now of defined appearance and apt to be tested.

One of the most essential conditions required to bring the wine to perfection is that the insensible fermentation occur under a moderate and constant temperature, which condition can conveniently be obtained by building a cellar in accordance with my hints appearing in the December (1916) and February (1917) issues of the Journal.

After twenty-five or thirty days, the slow fermentation being completed, the wine becomes cold, and almost all the refuse will be deposited at the bottom of the cask. As soon as the wine becomes clear it is necessary to separate it from the dregs. The racking off must be executed on a dry, calm day, preferably a cool one.

The casks into which the wine will have to be racked off should not be too large, as the duration, efficacy, and degree of the reawakening of the insensible fermentation will be in proportion to the volume of the mass. Vessels of decreasing capacity are therefore required in graduation as the wine approaches the maturity stage, the wine becoming by this

process finer and finer until ready for bottling. It may be mentioned that the vessels into which the wine has to be racked off should be sulphurated. The sulphurous acid gas will free the vessel of the presence of air and destroy any germs whose presence may bring alterations to the liquid. This sulphurating of the casks keeps the wine unalterable owing to the strong anti-fermentative action which the sulphurous fumes strongly possess, and this action renders the germs inert and without efficacy to act on the wine. The sulphurating of the casks can be executed with sulphurated matches burnt in a small iron cage of cylindrical form, as shown in the accompanying sketch.



This cage should have the sides perforated and be of a diameter not greater than that of the bung-hole of the cask, and be suspended by a wire.

The preparation of the sulphurated matches is simple, as is also the sulphurating of the casks with the above illustrated cage. Melt the sulphur in an earthenware dish, and, as soon as it is liquid, plunge into it strips of calico in width about 2 in. and in length as long as they are needed. Let them be uniformly covered with the liquid—sulphur. After a few seconds the sulphur will adhere to the cloth, and the matches are ready for use when cold.

For sulphurating the casks, suspend in the cage one of these specially prepared matches, light it, and insert the cage, with match, half-way down in the cask. To enable the cage to stop in this position, fix the suspending wire through a wooden or cork bung, of diameter greater than that of the usual bung-holes. Sometimes the match becomes extinguished as soon as it is introduced in the cask, owing to the presence of carbonic acid gas in the vessel. To remedy this, open all holes existing in the cask, so as to allow the external air to enter first. The casks after being so prepared and sulphurated are ready to receive the wine to be transferred. In racking off avoid as much as possible allowing the wine to come in contact with the air, whose constituents, excepting the oxygen, are dangerous to the wine.

[TO BE CONTINUED.]

RAISIN DRYING AND CURING.

(Extracted from "The Raisin Industry," by Gustav Eisen, published by H. S. Crocker and Co., of San Francisco, U.S.A.)

In describing the processes of drying, curing, packing, and assorting, the only methods which should be used by every conscientious raisin-grower and packer have been followed. These methods are now actually in use, not by every packer and grower, but by the best of them, by those who strive to produce a very superior article which will compare favourably with and compete successfully with the best products of Malaga or other foreign growing districts. Raisins may be produced by cheaper methods than those advocated, but only great care, judgment, and study will produce the best results. In the raisin industry it pays to produce the best, and to attain this very little extra care is required.

SIGNS OF MATURITY.

There are three different ways by which the ripeness of a grape can be tested—saccharometer, taste, or colour. The saccharometer is a well-known instrument, consisting of a graded glass tube that will sink to different depths in liquors containing different percentages of sugar. There are different kinds of saccharometers, but the most practical one for the general raisin-grower is one divided into 100 degrees, each degree showing one per cent. of sugar to every hundred of water. Thus, if the saccharometer sinks down to 25, we know that the "water or must" contains 25 per cent. of saccharine and 75 per cent. of water. To properly test the grapes, a few bunches should be picked from several vines; the juice should be squeezed out and passed through a towel or otherwise strained. The must is then poured into the test tube and the saccharometer inserted. If it shows 25 degrees or more of sugar, the grapes will make good raisins, but for very superior raisins, several degrees more of saccharine are needed. It is not unusual to find the grapes reach 30 degrees in favoured localities and in favoured seasons. Only inexperienced vignerons will require the aid of the saccharometer to determine the state of ripening of the grapes; the more experienced judge by taste and colour. The taste, of course, is the most commonly used method of ascertaining the ripeness of the raisin grapes. Every grower, experienced or not, should examine his grapes repeatedly. To give directions for tasting the ripeness of grapes is, of course, impossible; it must be learned and can only be learned by practice. It is enough to say here that the grapes should taste very sweet, contain no acid, and, if possible, be rather solid.

The colour is also a valuable adjunct in determining the ripeness of the rasin grapes. Fully ripe and perfect fruit should be amber-yellow, somewhat transparent and waxy. If this colour is combined with great sweetness, and in Muscatels with absence of acidity, we can be sure the grapes are ripe. Some grapes do, however, especially when too much exposed to the sun, acquire the yellow amber tint without being sweet, but they are readily distinguished from the ripe grape, by their being of smaller size, and harder, tasteless, and acid. Such grapes never

develop into good, mature grapes, and do not make good raisins. All ripe grapes do not become amber-coloured. Those that grow in the shade and on very damp ground, remain always green, although they acquire a certain sweetness and will make good raisins. The Muscatel grapes will make saleable raisins if not fully ripe, but in order to make superior and good raisins all grapes should be dead ripe, especially so if the grapes are to be dipped in lye. If unripe or partially ripe grapes of Muscat or Sultanas are dipped, they make very poor and red raisins; it would be better if they had never been dipped. This is especially so with the Sultana, which begins to ripen and is eatable long before the Muscat, but which only makes a good dipped raisin after the Muscat has been ripe for some time. Three or four days make a great difference sometimes in the amount of sugar in the grapes, and consequently in the quality of the raisins, and the experienced grower will keep his grapes on the vines as long as possible to attain the greatest possible amount of sweetness. But, on the other hand, it takes judgment to foresee how sweet the grapes will be, as in unfavourable seasons they will not attain their full sweetness even if allowed to hang long on the vines. To know the time after which the grapes do not increase in sugar, requires much experience and acquaintance with the locality where they are grown. In this respect different years vary very much.

PICKING.

Many vignerons pick their grapes too green or before they are fully ripe. Not all grapes ripen at the same time, and to make the best possible raisins out of the grapes, it is necessary to pick over the vineyard several times, each time picking only the ripest grapes.

In places where there are two crops of grapes, at least two pickings are necessary, and in many places two pickings are enough. The green grapes of the first crop are then left to be picked with the second crop, at which time they will probably be perfectly ripe and very choice. But if the vineyard is small and easily managed and the owner wishes to realise the most he possibly can, he should make at least three different pickings, each time taking care to pick only those that are fully ripe, and which would make a first-class quality of raisins. The pickers generally use small, pointed knives for separating the bunches, and they are preferable to small shears, as better enabling the picker to reach farther in between bunches and branches and to cut the former without injuring the branch.

In picking great care should be taken. It is always best to begin picking in the poorest part of the vineyard, and some experience is needed by the pickers that they do not pick too many green grapes. The poorest part of the vineyard is also apt to have the ripest grapes. The large fine bunches should be handled with the greatest care, so that the bloom of the grapes may not be injured. The bunches generally should be handled by the stems only, and if this be impracticable, by the stem as much as possible. In separating a large bunch from the vine, the bunch should be cut as close to the stem as possible, and at the end

of the stem of the bunch there should remain a portion of that broader part by which the bunch is attached to the main branch. A picker should average not less than fifty trays a day of cleaned and assorted grapes. The picking of the grapes is facilitated by the previous care given to the vines. Neglected and entangled vines are much more difficult and expensive to pick than those which have been properly cared for and correctly pruned the season before.

CLEANING.

When the bunch is picked or cut from the stem, it should be cleaned. If it is a first-class, or even an ordinary large bunch, every sunburnt berry, every leaf, twig, or other conspicuous foreign substance must be carefully removed with the picker's right hand while the left hand holds the bunch by the stem. This cleaning must at some time be done, and at no time can it be performed with better results than when the grapes are green. The stems are then soft and flexible, while later on they are brittle, and in endeavouring to remove foreign substances many berries will be detached and sometimes even the whole bunch broken. This cleaning of the bunch does not extend to third-rate or small bunches which are to be used for loose raisins. The latter can be cleaned very rapidly by machinery, and it would only be a waste of time to clean them by hand-picking. The use of a pair of bellows is also very practical. With these much of the spiders' webs and smaller refuse can be removed, which could not be got rid of in any other way. If the grapes are carefully assorted when picked, and the different grades placed on separate trays as they should be, this cleaning is done rapidly, as the largest part of the crop, which will only make loose raisins, need not be cleaned.

DRYING ON TRAYS.

As soon as the grapes begin to ripen, the trays should be distributed along the rows in the vineyard. They may either first be placed in piles at every row where the roads cross the vineyard or at once distributed along the vines. The former method is to be preferred, as it protects the trays from dirt and dust. Muscat vines in proper bearing require one or two trays to the vine, while for young vines one tray will suffice. The ripe grapes are placed directly on the trays and not previously packed in boxes. In placing the bunches on the trays, it is better the picker should have two trays, one for each grade. On one tray he places the large bunches that promise to make first-class bunch raisins; on the other, the inferior and loose berries. The large bunches should be placed on the trays, stem-side down, as this side will, when cured, become the finest and will eventually be graded by the careful packer as first-class. The smaller bunches and loose berries may be placed any way almost, so long as they are not heaped on one another. That part of the raisin which, in drying, touches the tray, will also present, when cured, a flat surface with several concentric layers, which are considered a prominent feature in the perfect raisin. The large bunches dry the slowest, and by having them from the beginning separated from the small and the loose, the latter can be brought away to the sweat boxes

when ready without necessitating the reassorting and handling from the trays, which at this time, when the stems are brittle, is expensive and injurious to the fine bunches. The larger bunches which are to produce layer raisins require less drying, as they are to be sweated or equalised before being packed. The smaller and inferior bunches, on the contrary, must be stemmed and assorted before they are equalised and immediately after they are taken from the trays. In order to stem readily, these raisins must be rather overdried, as if soft they would tear from the stems instead of having the latter broken. The advantage is, therefore, seen of having the two grades on different trays. Without the necessity of assorting, the layer trays can be taken up when they are ready and the loose can remain as long as necessary without fear of the layers being overdried. By this assorting when green, each grade can be treated separately in a quick and effective way. A tray 2 ft. by 3 ft. may be made to hold comfortably from 18 to 20 lb. of grapes. The first crop should be placed pretty close on the trays so that no part of the tray may be visible, as the reflected heat will be too great and may injure the raisins. The second crop should be packed less closely, as the reflected heat from the surface of the tray will help to dry the grapes. This, of course, only refers to localities where the temperature during the first drying is high. The warmer it is, the closer should the bunches be packed on the trays, but when the drying weather is unfavourable, plenty of space should be given to the grapes. It is often said that grapes, to make good raisins, should not only dry but cure. Good raisins should dry and cure at the same time, by which is meant that a chemical process is taking place which is something more than the mere evaporation of the water in the grape. The heat necessary and favourable for drying the grapes is different in different localities. At certain temperatures the raisins will get cooked and spoil, assume a red colour, lose their sweetness, become sour and hard, and covered with large, sharply-defined corrugations—signs of a very inferior or even entirely worthless raisin. It is thought that from 90 to 103 degrees in the shade would be the best temperature for drying perfectly ripe and sweet Muscat grapes. When grapes are very ripe, a much higher temperature will not injure them, while sour and unripe grapes, especially of the second crop, will burn or cook at a lower temperature than would be the proper one for ripe grapes. It is not always advisable to stop picking when the heat becomes too great. A better method is to stack the trays in the field so as to protect the raisins from the sun. When the heat subsides, the trays are again spread. Some packers have suggested that to secure good raisins the trays should be stacked for several weeks in the beginning of the period of the drying. For the production of the usual dark-coloured raisins this is not necessary nor even advisable, except when the heat is such that the raisins would cook and spoil. With a little experience this cooking of the grapes can easily be detected by the smell emitted by the grapes. As soon as they are the least injured by the heat, a cooked flavour begins to pervade the whole vineyard. When this peculiar flavour is noticed, and when the berries begin to show small red and soft blotches on the side facing the afternoon sun, the

stacking should be commenced as quickly as possible. If the trays are kept in piles for several days, the injured grapes will partially recover and at least to some extent regain their colour. Greatly injured grapes will dry much slower, sometimes remaining several weeks behind those which were not injured by the sun. Slightly discoloured raisins may partially regain their colour by sweating, but they will not otherwise improve.

After the trays are filled with grapes the best way is to put several rows of trays together, or, rather, place the trays from three rows of vines along one of the spaces between the rows. This gives more compactness to the crop, makes it easier to handle the trays, and facilitates the stacking of the trays, their turning and reversing, or any labour with them that may be required. By thus clearing some of the spaces between the rows, admissions for trucks and wagons is obtained close to the trays.

TURNING.

After the grapes have been exposed to the sun for some time they must be turned. By this time it will be found that the grapes have dried principally on the upper side, while the lower side is comparatively green. The time when the turning of the grapes should be done depends entirely upon the weather. One-half of the drying process should be over, and this requires a longer or a shorter time. When the time for turning has arrived, it will be found that the under side of the grapes, or, rather, the side of each berry that was placed against the trays, has flattened out and shows concentric circles, which are considered of much beauty, and greatly valued in all good raisins. When they are well formed and established it is generally time to turn. If the grapes are turned before these concentric circles are hardened, the latter will open and become less distinct. Another objection to turning too early is, that the upper side of the grapes, if not properly dried before turning, will dry but very slowly afterwards, and often so slowly that the raisins may have to be turned a second time, which will prove both expensive and to the disadvantage of the raisins. One turning is always enough and the only one proper. Turning should, as much as possible, be done in the morning or at least in the forenoon, while the air is yet cool and the stems of the raisins damp.

REVERSING.

This is an operation not properly understood by every raisin-grower, but it is still of the utmost importance, especially for the first-class bunches of the first crop, which naturally dry much slower than the smaller bunches. But the method is also very useful for the second crop, when late in the season the drying is slow and uncertain. The reversing consists simply in reversing the trays in such a way that the edges which first faced the north, afterwards face the south, and *vice versâ*. The object of reversing is plain. It will nearly always be found that the raisins at the top or on the side of the tray nearest the north will dry

much more slowly than those on the side facing the south. To prevent this and to ensure equal drying at the top and bottom, the reversing is performed after the trays have been first turned. This will enable the grower to dry his raisins several days sooner than he otherwise would. Indeed, at a critical period of drying, as when rains may fall and injure the raisins, it is of the utmost importance to hurry the crop as much as possible. The reversing at this time is almost as important as turning.

ELEVATING THE TRAYS.

It is a good thing to elevate the trays containing the tail end of the second crop. The best way is to place the trays on the top of the vines, when it will be found that the free circulation of air underneath will help to dry the raisins, and prevent rot and mould.

STACKING AGAINST RAIN AND DEW.

The stacking of the trays is also a valuable help in keeping out dew and cold. When heavy rains are expected, the grapes, whether partially dried or not, should always be stacked. It will keep the stems from rotting off from the berries, and will generally save the crop from being seriously injured. There are several ways of stacking. The flat stacking is used principally when the raisins are very dry, and when it is of importance that no air should enter the trays. In flat stacking, one tray is simply placed on top of another, and the circulation of air is thus brought to a minimum. In rainy weather the roof stacking is to be preferred. Instead of placing one tray on the top of another, the trays are placed in two piles, joining each other in such a way that the inner end of every tray overlaps the edge of the tray in the adjoining pile. The lifting up of one edge of the tray gives to the whole pile a roof-like appearance, and the angle in which the trays join together becomes steeper the higher the pile grows, until at the height of 3 or 4 feet the trays slant so much that the raisins cannot rest on them, but are in danger of sliding off, when, of course, the pile should not be made any higher. The advantage of roof-stacking is that it admits the air and sheds the rain better. In damp weather the piles should not be covered on the sides for any length of time, as the raisins will then mould more rapidly. If instead of joining two piles of trays three are made to join, the centre stack will be flat, while much air is admitted to the raisins. In this stacking the two first trays are placed flat on the ground at almost the distance of one tray. It must be remembered that in very rainy weather no kind of stacking will be of any value, while when the showers are few and far between stacking may save the crop. Stacking is especially valuable in conjunction with dryers, when protection during a few days only is all that is needed.

[TO BE CONTINUED.]

Tropical Industries.

COCOA.

The "Journal of the Jamaica Agricultural Society" of November, 1916, gives the results of experiments which have been carried on for a series of years in the manuring of cocoa and shade for cocoa. From this we gather that from 1914 to 1915 the rainfall on River Estate, Trinidad, was only 60·44 in., and the season is represented as not being a favourable one. Nevertheless several of the manured plots gave an increase in yield compared with the crop of the previous year. The previous results that we published in this Journal showed great variation of yields from different combinations of manures and fertilisers. By manures we mean animal and vegetable matter; by fertilisers mineral plant foods. In Dominica results of experiments on cocoa resulted in the heavily mulched plots giving the best yields and best net results in profit. In Trinidad mulching was found too expensive, and while often resulting in large yields did not give substantial net profits. It is the net profit that counts. For instance, a combination of 200 lb. sheep manure, 100 lb. bonemeal, and 25 lb. sulphate of potash resulted in a return of 10,542 pods per acre over five years, while no manure gave 9,501 pods, but the net profit after deducting cost of manuring was 73·74 dollars for the manured plot and 87·12 dollars for the non-manured plot. On the contrary, a combination of 3,600 lb. pen manure, 100 lb. basic slag, and 13 lb. sulphate of potash per plot. gave 16,146 pods and a net profit of 128 dollars, the fourth largest of all. The third largest resulted from an application of 178 lb. bird manure, which gave a net profit of 132·88 dollars. A second control plot, to which no manure was added, gave 14,055 pods and a net profit of 128·81 dollars. The second largest net profit resulted from an application of 94 lb. bird manure, 25 lb. sulphate of ammonia, and 50 lb. sulphate of potash, giving a yield of 19,857 pods and a net return of 163·59 dollars. This was also the second largest yield of pods and of dry cocoa, the latter being 1·655 lb. Each plot is 1 acre and contains 300 trees. The largest net profit of 173·41 dollars from 21,000 pods and 1,750 lb. of dried cocoa resulted from an application of 3,600 lb. of pen manure, 13 lb. sulphate of ammonia, and 25 lb. sulphate of potash, the cost of which was 19·09 dollars. Lime alone gave a poor return of only 58·03 dollars and 10,000 lb. of mulch only gave a net return of 51·64 dollars, both much poorer than no manure at all. Mulching apparently is of no avail on that particular estate.

In the second series of experiments, comparisons are made of the yield of individual trees under the same conditions. The yields vary from an average over four years of 14·67 pods up to 70. These are from the manured fields. The natural yield of unmanured trees ranged from 16·93 to 34·26. The average number of pods per lb. of dry cocoa was 11·32 over four years.

* * * * * * *

The next series of experiments is with—shade, partial shade, no shade. The following are the results for trees thirty to thirty-five years old this year, average number of pods over five years:—

Full shade	8·863
Partial shade	10·222
No shade	9·889

In the experiments on nine to ten years old trees where suckers were allowed to grow, the 3, 2, 1 and no suckers resulted as follows:—

	Pods.
No suckers	12,333
One	12,375
Two	11,505
Three	11,124
All suckers	9,768

In twenty-five to thirty years old trees the result was as follows:—

	Pods.
No suckers	13,140
One	11,257
Two	8,645
Three	11,541
All	12,514

THE GERMINATION OF THE COCONUT.

In the "Journal of Heredity" for April last is to be found the result of a most interesting study of this phenomenon by Messrs. Cook and Doyle, of the U.S.A. Department of Agriculture.

The article opens with the laconic remark that "coconuts are seeds," but as the term coconut is applied in the article itself to the nut with the husk on, the statement is somewhat misleading. In reality the coconut is a drupe or stone-fruit, in which the stone is enveloped in a fibrous mesocarp. The true seed lies within the hard woody endocarp or shell of the so-called "nut," which, by the way, is again a misnomer.

The authors dispute the theory of maritime distribution, maintaining that the coconut is neither a seashore plant by nature nor dispersed by the sea. In support of their contention they state that the same type of husk which characterises the coconut, and leads people to believe that it is intended to float in water, is found in many other species of palms which do not grow on the seacoast and are known never to be distributed by water; while the waxy coating on the husk (believed to be a waterproof material) is common to all palms and found specially well developed in many inland species.

In spite of the coconut being so abundant and of such economic importance in the Pacific Islands, there is, according to the authors, nothing to show that its habits enable it to exist permanently or in a truly wild state in a littoral or oceanic environment. The common belief of its being a native of this region is stated to be contrary to the opinions

of those who have studied the palm as it grows in the Pacific Islands. These authorities are of the view that there are no wild coconut palms in the Pacific, that it has everywhere been actually planted by man, and that the palm does not survive human neglect for any period.

It is argued from the store of water in the interior, the large supply of solid endosperm and the thick fibrous husk, that the native habitat of the coconut must have been a relatively dry clime where the plant had to grow to a fairly large size before it could draw upon soil moisture; while on the other hand such provision would seem unnecessary in a maritime plant. The great size of the nut would indeed be a disadvantage in this latter situation as preventing it from being buried in the sand. We must, therefore, according to the authors, think of the coconut as an interior palm growing in an alkaline soil and subject to prolonged droughts, in order to appreciate the significance of its large seed, its copious supply of endosperm and water and thick spongy husk capable of absorbing moisture when brought within reach of it. As is generally known, the coconut is also intolerant of shade, and this points to its original habitat being a region where other vegetation was absent or very sparse.

Going back to the husk, one cannot fail to notice its suitability as a medium of starting the growth of roots. Indeed, the coconut may be likened to "a self-potted plant," and the hanging up of coconuts till the whole process of germination is complete, and the green plant has appeared, is a fairly common practice which supports this view.

A remarkable thing about the coconut is the small size of the embryo or living germ in comparison to its other parts. It is a tiny cylindrical body lying just beneath the largest eye in the shell. When germination begins the embryo elongates and enlarges at both ends. From the outer end arise the young stem and roots, while internally is formed a large spongy mass called the cotyledon through which are scattered vascular strands which converge and become fibrous at the narrow neck connecting the spongy mass with the stem.

The function of the cotyledon is to convey the food material derived from the solid endosperm to the seedling plant. In order to be absorbed this material has to be digested under the influence of the ferments secreted by the cotyledon and passed into the water contained in the central cavity.

The fluid-filled cavity would in addition to its storage function appear to play the part of a stomach to provide for the digestion and absorption of food material stored in the solid endosperm. In this way the milk would be periodically recharged with food materials to replace those absorbed by the cotyledon.

It is unnecessary to follow the various changes in composition of meat and water which take place as the process of germination goes on.

The original article appeared in the "Journal of Heredity," to which periodical we duly acknowledge our indebtedness.—"Fiji Planters' Journal."

THE ALGAROBA TREE IN CYPRUS.

The seeds are placed in layers in damp sand and, being well watered, they are left thus for about twenty days, by which time the shell has burst, and the young cotyledon visibly projects. The germinated seeds are then taken up from the boxes or beds and sown directly into holes properly prepared for their permanent growth. The plan is simple, and does away with the trouble and expense of pots and of watering the plants while in pots or in beds. The young plants grow much more quickly and sturdily than when transplanted at a later age, and the number of failures is quite insignificant. The Department of Agriculture in Cyprus, after some trouble, induced the villagers in a district characterised by a total absence of vegetation to plant algaroba and almond trees in Morphou Plain, providing both seed and expert advice. The result in 1916 was that some 15,000 trees were raised in that year, and large numbers were also planted in other parts of the island. Seedlings do not come true to product in the case of the carob, another variety of tree bearing the fruit known as Locust, or St. John's Bread, and these require to be grafted, as the tree is dicœcious—*i.e.*, bearing male and female flowers on different plants. In the case of the Algaroba it would seem that grafting or budding are not necessary, in proof of which a number of Algaroba seedlings were taken from Sydney to the Pera Artesian Bore, near Bourke, a distance of 500 miles. The trees throve wonderfully, and developed into magnificent specimens, bearing heavy crops of fruit.

We have a great deal to learn about the Algaroba, which is usually confounded with the carob, the botanical name of the former being *Prosopis juliflora*, and of the latter *Ceratonia siliqua*.

STATE INSTRUCTOR IN POULTRY.

Mr. J. Beard, who has been appointed Instructor in the Poultry Industry in this State, has a long record as a successful breeder of most varieties of poultry. His successes in prize-taking at many agricultural shows in Queensland, and notably at the National Agricultural and Industrial Association's exhibitions at Bowen Park, have been almost phenomenal. His services as a judge at country shows were constantly requisitioned, and in no case, as far as we know, were his judgments called in question by exhibitors. In connection with his work at the Department of Agriculture and Stock, Mr. Beard will give his attention to compiling a booklet dealing with all phases of the industry—a work for which his intimate knowledge of the business especially qualifies him.

Entomology.

THE CANE-BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, the Entomologist:—

With reference to investigations conducted this season to study more fully the nocturnal habits of our "grey-back" cane-beetle, it may be of interest to record additional data relating to this insect, and to *Lepidiota frenchi*, Blackb., a smaller reddish-brown scarabaeid affecting cane.

These observations were made at the "Carrah" Plantation, near Gordonvale, on fourteen different evenings, between the hours of 6 and 10 p.m., the artificial light used being an acetylene lamp giving an illumination of 21 litres.

The following notes briefly summarise results obtained in this connection from the dates 15th November to 28th December:—

1. Unlike previous experience, in 1914, many specimens of albohirta were attracted before daylight had quite disappeared. Early in the season (15th to 25th November) flight commenced at 7 o'clock, reaction generally taking place at about 7.20 p.m.; whereas during December, 1914, the time spent on the wing prior to entering the light-trap was just forty minutes (7.20 to 8 p.m.).

2. This species displays great aerial activity when the thermometer stands above 80 and not lower than 75 degrees Fahr., but at 70 degrees Fahr. flies less freely, while a low temperature, such as 65 degrees Fahr., apparently stops flight altogether and renders the beetles torpid.

3. The duration of the period usually passed on the wing each evening depends, too very materially, on the amount of moisture in the ground. Emergence of the beetles this season was not followed by showery weather, and in proportion as the surface soil each day became drier the time occupied by flight during twilight decreased very noticeably. On 21st November, for example (seven days subsequent to the appearance of this insect) albohirta flew for about twenty-five minutes only, the temperature at the time being 76 degrees Fahr.; and a couple of days later, the weather still continuing very sultry, not a single specimen was heard flying at the usual hour, although the dry bulb registration was 78 degrees Fahr. This failure of albohirta to appear on the wing was again noted on 25th November (75 degrees Fahr.), when, however, numbers of *Anomala australasiæ*, Blackb.—a small cane-beetle of a deep bronzy-green colour—were observed at dusk circling about and settling upon the foliage of certain native shrubs. Further scientific data respecting albohirta was obtained, but need not be recorded at present.

On 13th to 14th December heavy rain fell at Meringa, and was at once followed by the primary emergence of *Lepidiota frenchi*. This well-known cockchafer, which occurs practically throughout open forest country, proved excessively abundant last December.

Its larvæ subsist on the roots of grasses and various herbaceous plants, but frequently attack sugar-cane, and are, no doubt, responsible at times for much damage to this plant.

At "Carrah," on 15th December, ample opportunity was afforded for studying the aerial movements of frenchi, which, being on the whole rather remarkable, are worthy of brief notice.

Flight commences upon the first approach of twilight (6.45 p.m. on the occasion in question), when suddenly, and without warning of any kind, myriads of these beetles start up simultaneously from every quarter and wildly dash to and fro as though determined to exercise their wings to the utmost. The scene strikes one as being decidedly novel, and, apart from its scientific aspect, well worth witnessing.

Standing among the cane-stools one seems to be encompassed by an immense swarm of beetles—thousands being in view at the one time—which in their erratic and ill-directed flight are constantly striking against the cane-leaves, the clapping noise produced by the sudden impact being plainly audible at a distance of several yards.

In addition to this oft-repeated sound the air, so still before, vibrates loudly with a continuous hum due to the accumulated buzzing of countless numbers of these insects. Although scarcely within the province of a monthly progress report, it may be of passing interest to mention that I found this humming note to be B natural—eight tones below the middle C of a piano at concert pitch—and very different from the deep tremulous drone that characterises the flight of our "grey back" cane-beetle.

The turmoil I have tried to depict lasts for about ten minutes, and then, ceasing abruptly, is immediately succeeded by copulation. At this stage the beetles may be seen on all sides clinging in couples to the cane-leaves at a height of 3 or 4 ft. above ground level, and if picked off from the foliage will lie quietly in the hand without making the least attempt to escape.

As previously pointed out in 1915 ("Australian Sugar Journal," Vol. VI., p. 893), plantations allowed to remain weedy whilst this cockchafer is in evidence are subject to infestation. I regret, however, to have to record that conclusive proof as to its having acquired a decided liking for cane was obtained last month, when upon examining land at Meringa under thoroughly clean cultivation both the eggs and newly-hatched grubs of this beetle were discovered among the main roots of the cane within an inch or two of the stools.

Important laboratory experiments were instituted this month (January), with a view to determining the effect of different stomach poisons upon very young larvæ of *Lepidiota albohirta*, Waterh.

This line of research work has necessitated the design and construction of special apparatus, by means of which it is possible to conveniently study the movements or tropic reactions of a grub to various stimuli whilst it is in the soil.

Some of the results obtained in this connection are decidedly encouraging, and will be reported in due course.

THE COTTON-BOLL WORM.

In the issue of this Journal for August, 1916, we suggested a method of protecting the cotton-bolls from the worm which attacks maize in the cob, by planting alternate rows of cotton and maize. In January last, a letter was received by the Department of Agriculture and Stock from the Assistant Director of Agriculture, Department of Agriculture and Forests, Sudan Government, inquiring which boll-worm it is that can be dealt with in this manner, and stating that "in the Sudan cotton is liable to attack from two boll-worms—the Egyptian boll-worm (*Earias insulana*) and the Sudan boll-worm (*Diparopsis castanea*), while in one isolated district we have a slight infection of the pink boll-worm (*Gelechia Gossypiella*), which has caused so much loss in Egypt during the last three or four seasons." The Assistant Director of Agriculture in the Sudan, Mr. R. Hewison, further writes: "None of these pests, so far as my experience goes, ever attack either maize or cowpeas in the Sudan, but confine their attention to cotton or other malvaceous plants."

The matter was referred by this Department to the Government Entomologist, Mr. H. Tryon, who reported as follows:—

" The reference in the 'Queensland Agricultural Journal' (August, 1916) to a method of trapping boll-worms by interplanting with maize or cowpeas, doubtless relates to the larger of the two lepidopterous insects that in Queensland affect the cotton in such a manner as to merit the designation of 'boll-worm." This insect is the pyralid moth (*Dichocrosis punctiferalis*), that not only feeds upon the cotton but includes a number of other plants in its dietary, and has, moreover, a wide range of occurrence in India, the Eastern Archipelago, Australia, &c. We have a second boll-worm that is congeneric with the Egyptian boll-worm, if not identical with it, but this, of course, is not partial to the maize.

"It may further be pointed out that this office* is not only not responsible for advocating the method of controlling or subjugating the Queensland Cotton-boll Worm prescribed in the official organ of our Department of Agriculture, and that has claimed Mr. Hewison's attention, but it is a method that it has positively discountenanced, observation having shown that the growing maize will attract the insect to places where already it does not occur, and that, when thus attracted, the moth will attack, simultaneously and indifferently, cotton and corn (maize) alike, the former being damaged where otherwise it might escape injury."

* Office of the Government Entomologist and Plant Pathoolgist.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH JANUARY TO 26TH FEBRUARY, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Sylvia II. ...	Shorthorn... ...	16 Jan., 1917	1,115	4·6	60·44	
Lady Margaret	Ayrshire	6 Jan. ,,	1,111	4·3	56·21	
Miss Edition	Jersey	25 Dec., 1916	942	3·8	41·96	
Violette's Peer's Girl	,, ...	13 Dec. ,,	671	5·2	41·22	
Lady Spec...	Ayrshire	17 Jan., 1917	925	3·8	41·21	
Iron Plate ...	Jersey	9 Dec., 1916	725	4·8	41·04	
Comedienne	,, ...	24 Nov. ,,	604	5·6	40·00	
Thorntons Fairetta	,, ...	26 May ,,	542	6·2	39·81	
Constancy ...	Ayrshire	27 Dec. ,,	822	4·1	39·60	
Sweet Meadows	Jersey	18 Aug. ,,	538	6·0	38·24	
Twylish's Maid	,, ...	2 Nov. ,,	602	5·3	37·70	
Miss Bell ...	,, ...	1 Aug. ,,	542	5·8	37·19	
Lady Annette	Ayrshire	11 Nov. ,,	747	4·2	36·87	
Lilia ...	,, ...	4 Sept. ,,	653	4·6	35·38	
Bluebelle ...	Jersey	22 June ,,	633	4·7	35·07	
Jeannie ...	Ayrshire	27 Oct. ,,	677	4·3	34·25	
Nina ...	Shorthorn... ...	23 June ,,	742	3·9	33·95	
Lady Dorset	Ayrshire	14 Sept. ,,	610	4·4	31·59	
Princess Kate	,, ...	20 June ,,	468	5·1	28·18	
Queen Kate	,, ...	15 June ,,	716	4·2	28·18	
Skylark ...	,, ...	21 March ,,	518	4·6	28·07	
Hedges Dutchmaid	Holstein	22 Aug. ,,	565	4·2	27·89	
Mistress Bee	Jersey	21 Jan., 1917	523	4·5	27·72	
Glen ...	Shorthorn... ...	18 Jan. ,,	680	3·4	27·01	
Rosine ...	Ayrshire	16 July, 1916	570	4·0	26·77	
Netherton Belle	,, ...	11 March ,,	438	4·9	25·31	
Charity ...	Jersey	28 May ,,	444	4·6	24·06	
Auntie's Lass	Ayrshire	4 April ,,	469	4·2	23·14	
La Hurette Hope	Jersey	6 Oct. ,,	412	4·7	22·82	
Leonie ...	Ayrshire	16 Aug. ,,	463	3·7	20·07	

The above cows were grazed on natural pasture only.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
AYRSHIRES.				
Queensland Agricultural College	Gatton	14	45	Ayrshire Herd Book of Queensland
State Farm	Warren, Rockhampton	9	88	ditto
H. M. Hart	Glen Heath, Yalangur	6	15	ditto
L. H. Paten	Jeyandel, Calvert ..	8	20	ditto
J. H. Paten	Yandina	8	23	ditto
J. H. Fairfax	Marinya, Cambooya	9	55	ditto
State Farm	Kairi	4	8	ditto
F. A. Stimpson ..	Ayrshire Stud Farm, Fairfield, South Brisbane	17	68	ditto
J. W. Paten	Wanora, Ipswich ..	10	42	ditto (Includes 29 cows in advanced register.)
J. Holmes	"Longlands," Pittsworth	6	20	Ayrshire Herd Book of Queensland
JERSEYS.				
W. Siemon & Sons Ld.	Roma st., Brisbane ..	6	60	Queensland Jersey Herd Book
Queensland Agricultural College	Gatton	13	30	ditto
W. J. Barnes	Cedar Grove ..	10	27	ditto
W. J. Affleck	Grasmere, N. Pine ..	6	31	ditto
M. W. Doyle	Moggill	4	12	ditto
State Farm	Kairi	6	40	ditto
James T. Turner ..	The Holmwood, Neurum	1	5	ditto
Robert Conochie ..	Brookland Jersey Stud Farm, Brooklands, Tingoora	9	21	ditto
G. A. Buss	Bundaberg	5	14	ditto
T. V. Nicholson ..	Windsor	2	8	ditto
Geo. H. Crowther ..	Montrose, Oakey ..	7	43	ditto
E. F. Fitzgibbon ..	Listowel, Oakey ..	7	30	ditto
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	37	Jersey Cattle Society, Queensland
J. N. Waugh & Sons ..	"Prairie Lawn," Nobby	2	44	Queensland Jersey Herd Book
T. Mullen	Chelmer	3	20	ditto
GUERNSEYS.				
Queensland Agricultural College	Gatton	2	2	Eligible but no Herd Book in Queensland

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
HOLSTEINS.				
Queensland Agricultural College	Gatton	3	10	Holstein-Friesian Herd Book of Australia
George Newman ..	Wyreema	9	37	ditto
F. C. G. Gratton ..	Towlerton, Kingsthorpe	2	11	Eligible for entry n Holstein-Friesian Herd Book of Australia
State Farm	Kairi..	1	2	ditto
R. S. Alexander ..	Glenlomond Farm, Columboola	3	1	Holstein Friesian Herd Book of Australia
S. H. Hosking ..	Racing Plains, Toogoolawah	2	23	ditto
C. Behrendorff ..	Inavale Stud Farm, Bunjurgen, *via* Boonah	5	10	ditto
ILLAWARRA.				
John Hardcastle ..	Dugandan	5	17	Illawarra Herd Book of Queensland
Hunt Bros.	Maleny	3	62	ditto
W. F. Savage ..	Ramsay	2	29	ditto
G. E. J. Chaseling ..	Brundah, Coolabunia	1	45	ditto
P. Biddles	Home Park, Netherby	3	14	ditto
A. N Webster ..	Yaralla, Maleny ..	5	65	ditto
A. Pickels	Blacklands, Wondai	4	82	ditto
J. P. Perrett & Son ..	"Corndale," Illawarra Stud, Coolabunia, *viâ* Kingaroy	4	52	ditto
H. Marquardt.. ..	Oak Villa Stud, Wondai	5	20	ditto
Wm. Wyper	"Strathobi," Maleny, Landsborough	3	100	ditto
MILKING SHORTHORNS.				
A. Rodgers	Torrans Vale, Lanefield	3	18	Milking Shorthorn Herd Book of Queensland
Wm. Rudd	Airedale, Christmas Creek, Beaudesert	6	30	ditto
W. Middleton	Devon Court, Crow's Nest	3	27	ditto
P. Young	Talgai West, Ellinthorp	11	60	ditto
BEEF SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	..	17	Queensland Shorthorn Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	20	Australian Herd Book
HEREFORD.				
H. F. Elwyn	Gunyan, Inglewood	250	750	Australian Hereford Herd Book
Mrs. Lumley Hill ..	Bellevue	45	127	Entered or eligible for entry A.H.H.B.
James T. Turner ..	The Holmwood, Neurum	25	50	Australian Hereford Herd Book
A. J. McConnel ..	Dugandan, Boonah	43	60	ditto

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
ABERDEEN ANGUS.				
G. C. Clark	East Talgai, Ellinthorp	4	10	Entered or eligible for N.Z.H.B.
SHORTHORN.				
C. E. McDougall ..	Lyndhurst, Warwick	25	50	Entered or eligible Q.H.B.
W. B. Slade	East Glengallan, Warwick	77	283	Queensland Shorthorn Herd Book
W. T. Scrymgeour ..	"Tara," Arthur st., Toowoomba	79	300	ditto
McFarlane Bros. ..	Kilbirnie Stud Farm, Radford	4	37	Milking Shorthorn Herd Book
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book

PAINLESS DEHORNING.

We have published, on several occasions, directions for dehorning calves and cows, the first of which appeared in the issue of the Journal for February, 1899; but, notwithstanding the obvious advantage of preventing the growth of horns on dairy stock, very few dairymen appear to appreciate the fact that horns, although they may sometimes be ornamental, are usually useless, expensive, and dangerous luxuries. To prevent the growth of horns, calves under three weeks of age, and even up to twenty months, can have the embryo horns removed, and no sign of a horny growth will appear on them again. Mr. R. E. Swan, of Landsborough, sends us the accompanying photograph of a portion of Mr. R. L. Burn's dehorned dairy herd at Mondure North, Wondai. The latter has made dehorning a practice among female cattle for seven or eight years, and is quite satisfied with its economy and the expedition with which it can be done. The process is practically painless to the animal, and consists in removing the embryo horns ("the buttons") with a sharp knife, and then applying caustic potash. For this purpose,

the hair should be clipped from above or around the horn and then rubbing on the spot, wherever the latter has been removed, the moistened caustic potash for about a quarter of a minute. The stick of potash must

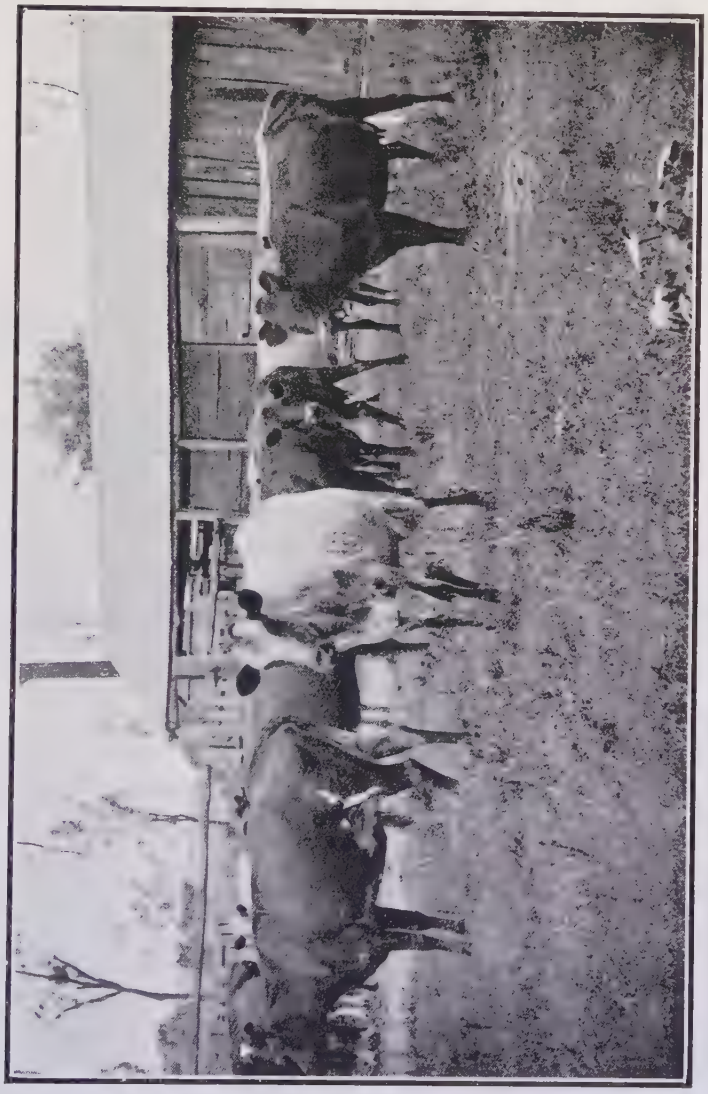


Plate 9.—Dehorned Dairy Herd on Mr. R. L. Burn's Farm, Wondai.

not be moistened too much, or the caustic may spread to the skin and destroy the flesh. For the same reason, the calf should be kept from getting wet for some days after the operation.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY 28 TO FEBRUARY 27, 1917.

Seven thousand six hundred and thirty-eight eggs were laid during the period under review, an average of 104·5 per pen. Mr. J. R. Wilson wins the monthly prize with 147 eggs. The following are the individual records:—

Competitors.	Breed.	Dec.	Total.
*Miss M. Hinze	White Leghorns ...	135	1,417
*T. Fanning	Do.	140	1,417
*J. Zahl	Do.	105	1,406
J. R. Wilson	Do.	147	1,392
*A. T. Coomber	Do.	117	1,387
W. Meneely	Do.	124	1,384
Geo. Tomlinson	Do.	129	1,376
G. H. Turner	Do.	120	1,370
*J. M. Manson	Do.	102	1,368
*E. A. Smith	Do.	123	1,322
A. Howe, N.S.W.	Do.	103	1,317
Dr. E. C. Jennings	Do.	113	1,317
*A. E. Walters	Do.	120	1,314
Mrs. Munro	Do.	115	1,289
J. M. Manson	Black Orpingtons ...	104	1,279
A. W. Bailey	White Leghorns ...	120	1,278
*W. H. Knowles, junr.	Do.	141	1,276
*E. F. Dennis	Do.	83	1,270
*J. H. Gill, Victoria	Do.	122	1,269
Mrs. W. D. Bradburne, N.S.W. ...	Do.	100	1,266
G. Prince	Do.	110	1,261
H. W. Broad	Do.	113	1,251
*Dixie Egg Plant	Do.	88	1,248
A. H. Padman, S.A.	Do.	118	1,248
T. Taylor	Do.	101	1,247
Cowan Bros., N.S.W.	Do.	139	1,247
*J. F. Dalrymple, N.S.W.	Rhode Island Reds ...	112	1,240
F. Clayton, N.S.W.	White Leghorns ...	116	1,234
E. Pocock	Do.	103	1,231
W. Lyell	Do.	84	1,229
T. E. Jarman, N.S.W.	Do.	95	1,224
*Mrs. J. H. Jobling, N.S.W.	Black Orpingtons ...	97	1,224
T. B. Hawkins	White Leghorns ...	103	1,224
*C. Knoblauch	Do.	110	1,214
W. Purvis, S.A.	Do.	98	1,212
P. Brodie	Do.	97	1,210
E. F. Dennis (five birds)	Black Orpingtons ...	121	1,209
R. Burns	S. L. Wyandottes ...	109	1,207
Kelvin Poultry Farm	White Leghorns ...	72	1,202
A. F. Camkin, N.S.W.	Do.	96	1,196
*E. West	Do.	107	1,197
King and Watson, N.S.W.	Do.	119	1,195
T. Fanning	Black Orpingtons ...	113	1,193
H. Jobling, N.S.W.	Do.	104	1,185
Mars Poultry Farm	White Leghorns ...	81	1,185
G. W. Holland	Do.	125	1,183
J. Anderson, Victoria	Do.	77	1,171

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Dec.	Total.
Cowan Bros., N.S.W.	Black Orpingtons ...	99	1,167
W. Becker...	White Leghorns ...	99	1,160
Mrs. C. Davis	Do.	78	1,153
A. Hirst, N.S.W.	Do.	105	1,152
Mars Poultry Farm	Black Orpingtons ...	125	1,151
*W. L. Forrest, N.S.W....	Do.	101	1,145
J. G. Richter	Do.	101	1,132
*Kelvin Poultry Farm	Do.	64	1,107
H. Hammill, N.S.W.	Do.	139	1,106
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	117	1,100
C. P. Buchanan	White Leghorns ...	70	1,093
Moritz Bros., S.A.	Do.	124	1,092
F. Clayton, N.S.W.	Rhode Island Reds ...	89	1,091
R. Burns	Black Orpingtons ...	85	1,081
S. B. Tutin	White Leghorns ...	67	1,076
*J. W. Macrae	Black Orpingtons ...	98	1,075
W. Lindus, N.S.W.	White Leghorns ...	95	1,031
Harveston Poultry Farm	Do.	102	1,062
F. W. Leney	Do.	89	1,026
J. Gosley	Do.	74	1,025
*J. Anderson, Victoria	Red Sussex	96	1,020
L. K. Pettit, N.S.W.	White Leghorns ...	89	995
A. T. Coomber	Sicilian Buttercups ...	124	985
W. H. Forsyth, N.S.W.	Black Orpingtons ...	69	948
F. W Leney	Rhode Island Reds ...	67	896
E. F. Dennis	White Wyandottes ...	101	871
Totals	...	7,638	87,321

* Indicates that the pen is taking part in single hen test.

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
Miss M. Hinze	242	214	266	218	247	230	1,417
T. Fanning	252	248	250	242	215	209	1,417
J. Zahl	235	251	216	239	242	223	1,406
A. T. Coomber	240	250	237	212	212	236	1,387
J. M. Manson	201	263	217	218	251	218	1,368
E. A. Smith	245	243	216	244	191	183	1,322
A. E. Walters	224	254	215	199	230	192	1,314
W. H. Knowles, junr.	201	208	216	188	239	224	1,276
E. F. Dennis	200	222	184	249	216	199	1,270
J. H. Gill	192	217	215	246	193	206	1,269
Dixie Egg Plant	269	248	245	246	...	240	1,248
J. F. Dalrymple	191	211	225	174	243	196	1,240
Mrs. J. H. Jobling	192	254	188	201	187	202	1,224
C. Knoblauch	188	218	203	182	205	218	1,214
E. West	234	219	189	191	169	195	1,197
W. L. Forrest	232	229	54	180	234	216	1,145
Kelvin Poultry Farm	187	167	159	183	245	166	1,107
J. H. Madrers	144	211	216	203	165	161	1,100
J. W. Macrae	153	217	197	200	146	162	1,075
J. Anderson	192	166	213	102	196	151	1,020

General Notes.

THE RAW COTTON SUPPLY.

In December of last year, an important conference of the Council of the British Cotton-growing Association with representatives of the Lancashire cotton trade, to discuss the cotton situation, was held in Manchester. The proceedings were fully reported in "Cotton," the official journal of the Manchester Cotton Association, of 16th December. It was shown that the work of the association had passed the experimental stage, and it had proved that cotton of the requisite quality and in sufficient quantity can be grown in the Empire. The question now arose as to what further developments were to take place. The difficulties which the association now were involved in were the result of the success which had been attained; the 1916-17 cotton crop, produced under the auspices of the association, was expected to exceed 100,000 bales, worth £2,500,000, and there was every reason to anticipate increased quantities next year and the following years.

A few years ago the association decided to concentrate their efforts on the West Indies, the Sudan, Uganda, Nyasaland, and N.E. Rhodesia.

The association was started mainly to prove whether the cotton wanted by Great Britain could be grown in the Empire, and the council claimed that they had proved their case up to the hilt as far as both quality and quantity were concerned. It was now a question of time, capital, and management. The work of the association being practically completed, the question was, what was to be done in the future? The financial difficulty was already a very serious one. It was expected that at least 70,000 bales would have to be purchased and financed by the association, representing a value of £1,500,000, and the great difficulty in financing this cotton lay in the fact that so much of it had to be bought before any of it could be ginned, baled, and shipped; and consequently it could not be financed in the ordinary way. The association had arranged with their bankers for open overdrafts amounting to £500,000, but the banks were of the opinion that the association's liquid capital was not sufficient to justify them in asking for such assistance in future.

The association's capital was nearly £500,000, of which £170,000 had been spent in experimental work, and of the balance about £180,000 was locked up in plant, machinery, investments in cotton companies, &c., leaving only £150,000 liquid assets. The banks would, however, be quite prepared to find the association all the money required for financing cotton provided the Government would guarantee them against loss. Furthermore, the production of cotton had increased so rapidly in Nigeria that it was absolutely essential that another ginning factory should be sent out at once at a cost of about £25,000, and other ginning factories would also be required shortly. The association found that the

best way of developing the industry was to pay the native producer a good price for his cotton, and also to buy all the cotton he offers.

The council realised that the association were at the end of their resources; it was impossible for them to undertake any new proposition of any sort whatever; it was not possible for them to develop cotton-growing further.

As a result of the increase in the home consumption of American cotton—which had increased from 5,500,000 bales in 1913-14, 6,000,000 bales in 1914-15, to 7,250,000 bales in 1915-16, and in 1916-17 it would show a further increase—we had American cotton at 1s. per lb., and Egyptian cotton at 2s. per lb.*

There are many people who think that the cotton situation to-day is more than dangerous, and is a most serious matter for the future welfare of the whole country. If Lancashire really realised this, and would back up the council, the association proposed to approach the Government and insist that this was a matter which must be taken in hand at once. Everyone recognised that the country was at war, and that the main proposition to-day was the winning of the war, but there was no reason why the possibilities of the future should not be taken into consideration now.

As regarded the future, there seemed to be three alternatives—

(*a*) That a Government Department should be formed to take over the work of the association;

(*b*) That the association should be reconstructed as a public trust, with Government assistance and under Government control;

(*c*) That the work might be left to ordinary commercial enterprise.

During the palmy days of cotton-growing in Queensland, the acreage under this crop rose from 2,884 in 1866 to 14,674 in 1870, declining to 9,663 in 1873; and 26,000,000 lb. of ginned cotton were exported, worth £1,300,000. To stimulate the industry, the Government gave a bonus of £5 (later reduced to £2 10s.) on every 500-lb. bale of cotton exported. This enabled the ginowners to pay 3d. per lb. to the farmers for their seed cotton. With a crop of only 1,000 lb. of seed cotton per acre, the latter received £12 10s. per acre. The cost of production and marketing, if hired labour was employed, was £3 6s. 4d., and if the crop was picked, as it usually was, by farmers with families, the cost of picking, £2 1s. 8d., was retained in the family. What was done then can be done now, notwithstanding the higher rate of wages paid to-day, as was evidenced last year by the amounts paid by the Department of Agriculture for cotton purchased from the growers. Next season's crop will also be purchased by the Department at 1¾d. per lb., and a *pro ratâ* division of the profits on sale after ginning, and deduction of actual expenses for ginning, bailing, carriage, freight, &c.

* The total American cotton crop was set down by Messrs. Neill Bros., U.S.A., on 16th December, 1916, at 13,150,000 to 12,750,000 bales (and this included "linters"), but they made no change in their figures of the probable consumption of 14,750,000 bales.—Editor, "Q.A.J."

FEEDING PIGS.

With reference to a statement concerning a feeding trial with pigs at Rothamsted, taken from the "London Live Stock Journal," and republished in the February issue of this Journal, Mr. A. J. Simpson, Mount Russell, New South Wales, writes:—

"It is a very well-known fact that the quantity of food required per 100 lb. of gain increases rapidly with the weight of the pigs. Experiments, especially valuable by reason of the large number of animals reported on, go to prove this." Our correspondent supplies the following interesting figures, which are the results of experiments made in Wisconsin, United States of America:—

Average Weight.	Number of Pigs Fed.	Average Feed Eaten per Day.	Average Gain per Day.	Feed Eaten per 100 Lb. Gain.
Lb.		Lb.	Lb.	Lb.
38	174	2·23	·76	293
78	417	3·35	·83	400
128	495	4·79	1·10	437
174	300	5·91	1·24	482
226	223	6·57	1·36	498
271	105	7·40	1·46	511
320	36	7·50	1·40	535
378	36	5·52	1·98	431
429	18	8·18	1·71	479
471	18	10·00	1·77	562

"Feeding on meal," says Mr. Simpson, "I find that it requires about 310 lb. of meal per lb. of pork in pigs from 54 to 82 lb.; 375 lb. of meal per lb. of pork in pigs from 82 to 115 lb.; 438 lb. of meal per lb. of pork in pigs from 115 to 148 lb.; 455 lb. of meal per lb. of pork in pigs from 148 to 170 lb."

SOCIETIES.

Aloomba.—Aloomba Farmers' Association. George Hesp, Secretary.

Beenleigh.—Beenleigh A. and P. Society. R. Newham, Secretary.

Charters Towers.—Charters Towers P. A. and M. Association. Show dates: 10th and 11th July, 1917.

Dalby.—Dalby Pastoralist and Agricultural Association. J. A. J. Hunter, Secretary.

Ipswich.—Ipswich Horticultural Society. S. H. Macartney and W. S. Johnston, Joint Secretaries.

Mackay.—Pioneer River Farmers and Graziers' Show Association. Show dates: 22nd and 23rd May, 1917.

Nambour.—Maroochy P. A. H. and I. Society. J. J. Wilkinson, Secretary.

Nambour.—Maroochy P. H. A. and I. Society. Show dates: 4th and 5th July, 1917.

Rockhampton.—Rockhampton Agricultural Society. Show dates: 21st, 22nd, and 23rd June.

Woolooga.—Woolooga and District Farmers' Progress Association. J. Chamberlain, Secretary.

Woombye.—North Coast Agricultural and Horticultural Society. E. E. McNall, Secretary. Show dates: 6th and 7th June, 1917.

Wowan.—Wowan Farmers' and Settlers' Progress Association. , Secretary.

MR. J. F. BAILEY.

The Government Botanist, Mr. J. F. Bailey, who has for many years done excellent work as Director of the Brisbane Botanic Gardens, and later as Government Botanist, in succession to his late worthy father, has accepted an appointment as Curator of the Botanical Gardens in Adelaide. Mr. Bailey's grandfather was the creator of those beautiful gardens, and it goes without saying that the grandson will carry on the work with the same energy and scientific knowledge which he brought to bear on the beautiful Brisbane gardens. Whilst regretting Mr. Bailey's departure, we wish him every success in his new career.

FISTULA.

When a fistula on withers is forming, it is customary to apply a blister or hot fomentations. This on rare occasions appears to effect a cure, but in the majority of cases it hastens the swelling and brings it to a head. After it has broken, surgical treatment is required.

The next thing is to find out the direction and depth of the fistula. This is done by using a flexible probe, some 8 or 9 in. in length. Free drainage must now be given by opening along the full length of the probe; or, if thought advisable, an opening can be made at the lower part of probe, and a seton of tape or other material passed through and tied on the outside. A seton keeps the wound open and assists in draining the cavity, but the first method of opening up is generally found more satisfactory. Both sides of the withers should be opened if necessary, and any necrosed (dead) tissue removed. The top of withers should not be opened crossways—from side to side—because there is a ligament which runs along the middle line of the shoulders from the head, which if cut causes serious consequences.

The chief points to remember are: Free drainage, the removal of all dead tissue, and the prevention of pockets where pus can accumulate.

The following lotion should be used every third day on the fistula after it has been opened up, until four applications have been applied:—Corrosive sublimate, ½ oz.; methylated spirit, 1 pint. This is best applied by soaking some cotton-wool or other absorbent material with the lotion, then packing the saturated cotton-wool in the fistula. This treatment can be repeated if necessary after ten or fourteen days' interval. Knives, probes, &c., should be thoroughly disinfected before using by placing them in boiling water or some disinfectant such as carbolic acid, Condy's Fluid, &c. Knives and other steel instruments should not be allowed to come in contact with the corrosive sublimate solution.

"QUEENSLAND AGRICULTURAL JOURNAL," 1916.

Should any of our subscribers have any spare copies of the Journal for February, 1916, we would be obliged if they would forward them to this office, Department of Agriculture and Stock.

Answers to Correspondents.

MILCH GOATS.

J. H. TERSTEEG, Deeford—

1. The age to which a goat will live before ceasing to yield milk is about nine years.

2. There is no special breeding-place of milch goats in Queensland. The common goat is the best, Angoras being of little use for milk production.

3. The age of a goat may be ascertained in the same way as the age of the cow, the dentition being the same. At 5 years, full mouth with all incisors well up; at 2 years, 2 permanent incisors well up; at 3 years, 4 incisors; at 4 years, 6 incisors; at 5 years, 8 incisors well up. After that, broken mouth.

MEASUREMENT OF AN EXCAVATED TANK.

"TANK" Mount Perry—

Your tank is shown on your plan as being 150 ft. square at the surface, 50 ft. square at the bottom, the depth being 20 ft. Multiply the length on the surface by the breadth. Thus: $150 \times 150 = 22,500$
Multiply the length by the breadth at the bottom $50 \times 50 = 2,500$
The middle section will be 100×100. Add 4 times the area of the middle section—*i.e.*, $100 \times 100 \times 4$ 40,000

65,000

Now multiply by 20 (the depth) $65,000 \times 20 = 1,300,000$. Divide this by $6 = 216,666\frac{2}{3}$ cubic feet. Then divide by 27 and you have the cubic yards 8,025, the content of the tank, equal to $1,354,166\frac{2}{3}$ gallons.

KAPOK.

"KAPOK," N.C. Line—

You can obtain young plants of Kapok from Mr. C. F. Dennis, Hawthorne road, Bulimba. They can be planted out in the spring.

THE PRICE OF RENNET.

In our issue of February last we published an article on the cost of pepsin and rennet, which was supplied to us by the hon. secretary of the Queensland Committee of the Commonwealth Advisory Council of Science and Industry. The price of rennet is therein given as £4 15s. per gallon. Mr. H. W. Smith, manufacturing chemist, of Melbourne, has informed us that this is not correct, as he manufactures and sells Genuine Australian Extract of Calf Rennet at the wholesale price of £1 5s. per gallon. The retail price to cheesemakers would be about £1 10s. per gallon.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR FEBRUARY, 1917.

Article.		FEBRUARY. Prices.
Bacon	lb.	9d. to 1s.
Barley	bush.	4s. 3d.
Bran	ton	£5 15s.
Broom Millet	„	£18 to £23
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	£2 10s. to £4
Chaff, Oaten	„	£4 10s. to £6
Chaff, Lucerne	„	£3 to £3 5s.
Chaff, Wheaten	„	£4 10s. to £4 15s.
Cheese	lb.	9d. to 9½d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	£4 10s.
Hay, Lucerne	„	£2 to £2 10s.
Honey	lb.	3d.
Maize	bush.	2s. 6d. to 2s. 7½d.
Oats	„	3s. to 4s.
Onions	ton	£7 10s. to £9 10s.
Peanuts	lb.	3d. to 4½d.
Pollard	ton	£5 5s.
Potatoes	„	£4 to £6
Potatoes (Sweet)	cwt.	2s. to 2s. 6d.
Pumpkins (Cattle)	ton	£1 15s. to £2
Eggs	doz.	1s. 3d. to 1s. 10d.
Fowls	pair	2s. 6d. to 3s. 9d.
Ducks, English	„	3s. 9d. to 4s.
Ducks, Muscovy	„	5s. 6d. to 6s 6d
Geese	„	7s. to 8s. 6d.
Turkeys (Hens)	„	7s. 6d. to 9s. 6d.
Turkeys (Gobblers)	„	16s. to 20s.
Wheat	bush.	3s. 6d. to 3s. 9d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per bundle	...
Cabbages, per dozen	1s. to 6s. 6d.
Cauliflowers, per dozen	...
Celery, per bundle	...
Cucumbers, per dozen	3d. to 1s.
Beans, per sugar bag	1s. to 2s.
Peas, per sugar bag	4s. to 10s.
Carrots, per dozen bunches	4d. to 9d.
Chocos, per quarter-case	1s. 6d. to 2s.
Beetroot, per dozen bunches	8d. to 9d.
Marrows, per dozen	1s. to 3s.
Lettuce, per dozen	4d. to 6d.
Parsnips, per dozen bunches	9d. to 1s. 6d.
Sweet Potatoes, per sugar bag	2s. to 2s. 3d.
Table Pumpkins, per dozen	1s. 6d. to 2s. 6d.
Tomatoes, per quarter-case	1s. to 2s.
Vegetable Marrows, per dozen	1s. to 5s.
Turnips, per dozen bunches	...
Rhubarb, per dozen bundles	9d.

SOUTHERN FRUIT MARKETS.

Article.	FEBRUARY. Prices.
Bananas (Queensland), per case	5s. to 10s.
Bananas (Fiji), per case	17s. 6d. to 19s.
Bananas (G.M.), per case	19s. to 21s.
Custard Apples, per tray	...
Lemons (Local), per bushel-case	6s. to 10s.
Mandarins, per case	...
Mangoes, per bushel-case	6s. to 8s.
Oranges (Navel), per case	...
Oranges (other), per case	5s. to 7s.
Pears, per case	...
Papaw Apples, per half-bushel case	3s. to 7s.
Passion Fruit, per half-case	1s. 6d. to 4s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	3s. to 6s.
Pineapples (Ripleys), per double-case	3s. to 5s.
Pineapples (Common), per double-case	3s. to 5s.
Strawberries (Local), per dozen punnets*	16s. to 18s.
Tomatoes (Queensland), per half-bushel-case	2s. to 5s.

* 1 punnet = 1 quart.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	FEBRUARY. Prices.
Apples, Eating, per case	6s. to 8s. 6d.
Apples, Cooking, per case	3s. to 6s. 6d.
Bananas (Cavendish), per dozen	1d. to 2d.
Bananas (Sugar), per dozen	1d. to 2½d.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	...
Granadillas, per quarter-case	...
Grapes, per lb.	3d. to 4d.
Lemons(Lisbon), per quarter-case	2s. 6d. to 4s.
Limes, per quarter-case	3s. to 4s. 6d.
Mandarins, per quarter-case	6s. to 8s.
Mangoes, per case	2s. to 3s.
Nectarines, per case	2s. to 3s.
Oranges (Navel), per case	15s.
Oranges (other), per case	4s. 6d. to 5s.
Papaw Apples, per case	9d. to 1s.
Passion Fruit, per quarter-case	1s. 6d. to 4s.
Peaches, per quarter-case	1s. 6d. to 4s.
Pears, per quarter-case	2s. to 3s. 6d.
Peanuts, per lb.	3d. to 4½d.
Persimmons, per quarter-case	1s. 6d. to 2s.
Plums (light), per quarter-case	1s. to 1s. 6d.
Plums (prime eating), per case	3s. to 4s. 6d.
Pineapples (Ripleys), per dozen	1s. to 2s.
Pineapples (Rough), per dozen	4d. to 1s. 6d.
Pineapples (Smooth), per dozen	1s. 6d. to 2s.
Quinces, per quarter-case	2s. 6d.
Rockmelons, per dozen	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	1s. to 2s.
Watermelons, per dozen	2s. 6d. to 7s.

TOP PRICES, ENOGGERA YARDS, JANUARY, 1917.

Animal.	JANUARY. Prices.
Bullocks	£17 10s. to £22 10s.
Bullocks (Single)	£24 10s.
Cows	£12 2s. 6d. to £16
Merino Wethers	34s.
Crossbred Wethers	36s. 9d.
Merino Ewes	27s. 9d.
Crossbred Ewes	32s. 6d.
Lambs	30s. 3d.
Pigs (Porkers)	60s.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

1917.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·46	5·21	6·41	5·41	6·19	5·58	5·46
2	4·58	6·46	5·22	6·41	5·41	6·18	5·59	5·45
3	4·59	6·46	5·23	6·40	5·42	6·17	5·59	5·44
4	4·59	6·46	5·24	6·40	5·43	6·16	6·0	5·43
5	5·0	6·46	5·25	6·39	5·44	6·15	6·0	5·42
6	5·1	6·47	5·25	6·39	5·45	6·14	6·1	5·41
7	5·2	6·47	5·26	6·38	5·45	6·13	6·1	5·39
8	5·3	6·47	5·27	6·37	5·46	6·12	6·2	5·38
9	5·3	6·47	5·28	6·36	5·46	6·11	6·2	5·37
10	5·4	6·48	5·29	6·35	5·47	6·10	6·3	5·36
11	5·5	6·48	5·29	6·35	5·47	6·9	6·3	5·35
12	5·6	6·47	5·30	6·34	5·48	6·8	6·4	5·34
13	5·6	6·47	5·31	6·33	5·48	6·7	6·4	5·33
14	5·7	6·47	5·32	6·32	5·49	6·6	6·5	5·32
15	5·8	6·47	5·32	6·32	5·49	6·5	6·5	5·31
16	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·30
17	5·9	6·47	5·34	6·30	5·50	6·2	6·6	5·29
18	5·10	6·47	5·35	6·29	5·51	6·1	6·7	5·28
19	5·11	6·47	5·35	6·28	5·51	6·0	6·7	5·27
20	5·12	6·46	5·36	6·28	5·52	5·59	6·8	5·26
21	5·13	6·46	5·37	6·27	5·52	5·58	6·8	5·25
22	5·13	6·46	5·37	6·26	5·53	5·57	6·8	5·24
23	5·14	6·45	5·38	6·25	5·53	5·56	6·9	5·23
24	5·15	6·45	5·38	6·24	5·54	5·55	6·9	5·23
25	5·16	6·45	5·39	6·23	5·54	5·54	6·10	5·22
26	5·16	6·44	5·39	6·22	5·55	5·52	6·10	5·21
27	5·17	6·44	5·40	6·21	5·55	5·51	6·11	5·20
28	5·18	6·43	5·40	6·20	5·56	5·50	6·11	5·19
29	5·19	6·43	...	...	5·57	5·49	6·12	5·18
30	5·19	6·42	...	...	5·57	5·48	6·12	5·18
31	5·20	6·42	...	..	5·58	5·47	...	...

The Phases of the Moon commence at the times stated in Queensland, New South Wales, and Victoria only.

			H.	M.	
8 Jan.,	○	Full Moon	5	42	p.m.
16 ,,	☽	Last Quarter	9	42	,,
23 ,,	●	New Moon	5	40	,,
30 ,,	☾	First Quarter	11	1	a.m.

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

7 Feb.,	○	Full Moon	1	28	p.m.
15 ,,	☽	Last Quarter	11	53	a.m.
22 ,,	●	New Moon	4	9	,,

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

1 Mar.	☾	First Quarter	2	43	a.m.
9 ,,	○	Full Moon	7	58	,,
16 ,,	☽	Last Quarter	10	33	p.m.
23 ,,	●	New Moon	2	5	,,
30 ,,	☾	First Quarter	8	36	,,

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m

7 Apr.	○	Full Moon	11	49	p.m.
15 ,,	☽	Last Quarter	6	12	a.m.
22 ,,	●	New Moon	12	1	,,
29 ,,	☾	First Quarter	3	22	p.m.

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of Years' Records.	Jan., 1917.	Jan., 1916.		Jan.	No. of Years' Records.	Jan., 1917.	Jan., 1916.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	13·63	15	3·75	7·64					
Cairns	17·17	34	5·57	32·01	Nambour	9·44	20	5·43	4·03
Cardwell	17·24	44	10·01	19·90	Nanango	4·52	34	7·98	2·36
Cooktown	15·32	40	7·23	16·33	Rockhampton ...	9·05	29	5·27	0·39
Herberton	10·02	29	6·78	5·50	Woodford	7·13	29	9·90	4·42
Ingham	16·84	24	11·02	21·08					
Innisfail	21·83	35	10·31	22·33					
Mossman	16·75	4	6·21	21·66	*Darling Downs.*				
Townsville	11·52	45	20·97	9·89					
					Dalby	3·28	46	3·64	3·59
					Emu Vale	3·25	20	5·09	2·25
Central Coast.					Jimbour	3·88	28	4·01	2·20
					Miles	3·99	31	3·72	3·52
Ayr	11·70	29	21·80	5·66	Stanthorpe ...	3·70	43	3·20	3·39
Bowen	9·59	45	12·76	7·76	Toowoomba ...	5·12	44	4·76	1·70
Charters Towers ...	5·53	34	14·72	1·85	Warwick	3·73	29	3·90	2·77
Mackay	14·02	45	10·26	9·25					
Proserpine	16·37	13	19·95	8·71					
St. Lawrence ...	9·38	45	4·28	0·41	*Maranoa.*				
					Roma	3·44	32	3·01	1·67
South Coast.									
Biggenden	5·51	17	*	0·76	*State Farms, &c.*				
Bundaberg	9·45	33	9·05	1·30					
Brisbane	6·49	66	9·07	2·34	Bungeworgorai ...	1·08	4	2·58	0·55
Childers	8·37	21	5·28	1·39	Gatton College ...	4·43	17	4·81	2·04
Crohamhurst ...	13·28	23	10·32	3·71	Gindie	3·28	17	4·50	2·37
Esk	5·60	29	7·01	1·54	Hermitage ...	2·76	10	4·50	2·99
Gayndah	4·84	45	6·77	0·60	Kairi	7·29	4	4·06	10·08
Gympie	6·75	46	4·48	4·02	Kamerunga ...	18·41	26	3·60	32·15
Glasshouse M'tains	9·43	8	7·56	3·48	Sugar Experiment Station, Mackay	14·82	19	11·80	7·56
Kilkivan	5·76	37	4·27	1·68	Warren	2·08	4	5·33	0·16
Maryborough ...	7·46	45	5·90	1·82					

* Incomplete.

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for January this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will be ready for a first or second hilling up. The last of the maize will have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slacked off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out paspalum roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Intsead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light, sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

KITCHEN GARDEN.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all

crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

FLOWER GARDEN.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, pentstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

Orchard Notes for April.

THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall

not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.

2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.

3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.

4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.

5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and, when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

Queensland Agricultural College.

FOR SALE.

Grass Roots, Rhodes and Paspalum, are obtainable at 2s. 6d. per sack, f.o.b. Gatton.

There are no farm seeds for disposal at the College.

POULTRY.

The following breeds are available:—Brown Leghorn, White Leghorn, Indian Game, Black Orpington, Silver-Laced Wyandotte, Rhode Island Reds. In last-named breed, no birds will be available this year, and only a limited number of eggs at 21s. per setting f.o.b.

Prices:

Cockerels—10s., 15s., and 21s.
Pairs—Cockerel and Pullet, 30s. and 42s.
Trios—Cockerel and two Pullets, 42s. and 63s.
} f.o.b. Gatton.

Prices vary according to quality. Unless crates are returned promptly, an extra charge of 2s. for a single bird and 1s. for each additional bird will be incurred.

Settings of eggs of the above breeds are available from 1st July up to 30th November Price, 10s. per setting, f.o.b. Gatton. Nine eggs in each setting guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle twenty-four hours before being placed under the hen.)

IMPORTED JERSEY BULL—Star Turn, 718 Q.J.H.B. Calved 5th August, 1913. Sire, Self Acting (4674). Dam, Solid Star (15934). Bred by Elias Cabot, St. Clements, Jersey Island.

IMPORTED AYRSHIRE BULL—Netherton King George (8181). Calved 9th December, 1909. Sire, Netherton King Arthur (7431). Dam, Midlands Young Greenfield (22621). Bred by Thomas Clements, Netherton, Newton Mearns, Scotland.

IMPORTED HOLSTEIN BULL—Froxfield Dairyman (12611). Calved 26th March, 1912. Sire, Froxfield Duke Bob (155). Dam, Froxfield Doris (1150). Bred by J. F. N. Baxendale.

Ayrshire Bulls.

No. 165. Sire, Stewart of Wanora. Dam, Lucinda. Date calved, 14th October, 1915. Price, £15 15s.

No. 177. Sire, Stewart of Wanora. Dam, Constancy. Date calved, 24th November, 1915. Price, £10.

Jersey Bulls.

All cattle sold accompanied by pedigree.

Pigs.

"Gatton Dandy Dick," by imported stock, Reg. B.H.B. of A., 18 months old. Price, £8 8s.

Orders will be received for Yorkshire boars and sows, from 2 to 3 months old, at £2 10s. each.

All prices—F.O.B. Gatton.

FOR SERVICE.

CLYDESDALE STALLION—**Lord Cellus** (imp.).
Service fee, £3 3s. per mare and 1s. 6d. per week agistment.

AYRSHIRE BULLS—**Netherton King George** (imp.).
Stewart of Wanora.

JERSEY BULLS—**Star Turn** (imp.).
Service fee, 10s. per cow; agistment, 1s. per week.

CUTHBERT POTTS, Principal.